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Recent Literature on Radio Astronomy, p. 72

January 1958 No. 1

METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

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METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

MALCOLM RIGBY, Editor

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1919

SPECIAL FEATURE IN THIS ISSUE

Compilation of Recent Literature on Radio Astronomy

By
Mary L. Rice

(For complete table of contents see back cover)

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But such a tide as moving seems asleep,
Too full for sound and foam,
When that which drew from out the boundless deep
Turns again home.

From: **Crossing the Bar**
by ALFRED LORD TENNYSON

EDITORIAL

During the past year the world has lost an appalling number of great scientists who hav made notable contributions to Meteorology and allied fields of Geophysics—internationall known leaders who have been beloved by two generations of students and research worker and who have enriched the literature with their contributions ranging from scores of textbook and monographs to hundreds of major and minor articles. Among these outstanding me most of whom were still actively productive, we can list only those we knew the best (includin the date of their death and their approximate age):

Heinrich Ficker	April 29, 1957	68
Charles E. Deppermann	May 8, 1957	68
Carl Störmer	Aug. 13, 1957	83
Irving L. Langmuir	Aug. 16, 1957	76
Carl-Gustav A. Rossby	Aug. 19, 1957	58
Harald Ulrich Sverdrup	Aug. 21, 1957	68
Snowden D. Flora	Aug. 28, 1957	78
C. E. P. Brooks	Dec. 14, 1957	68
Charles F. Brooks	Jan. 8, 1958	66

If there was any common denominator among these irreplaceable scholars and teache apart from their intense and unflagging devotion to science, it was their keen personal inter in, and loyalty to, those who followed in their footsteps. Anyone who has had any extensi or repeated contacts with ROSSBY, SVERDRUP, FICKER, or C. E. P. or CHARLES F. BROO will testify that however much these men were interested in solving problems, or h become involved in projects, programmes or organizations, they gave a much higher prior to persons than they did to organizations, programmes, projects or problems. This mak one wonder if the hundreds of millions of dollars being spent during IGY on hardware, obser tions and operations will compensate (in terms of progress) for the loss, not only in terms the personal effort that Rossby, Sverdrup or any of the others who were under 70 could ha accomplished in the next decade, but in terms of what their inspiration and guidance wo have meant to the many, or even to the few students they might have illuminated, irradia or infused with their spirit and devotion and above all with their faith that the solution to problems lies in people rather than machines.

All that the rest of us who have been spared from an untimely end to our efforts can d to pass on the divine fire and the human warmth we have been fortunate enough to rece from one or all of these "masters," so that by a chain reaction the next generation will prod 10 or 100 or 1000 times the results that the past generation was able to accomplish. N month we will have more to say about the life of C. E. P. BROOKS whose constant associat and inspiration during the past decade has been deeply appreciated.

MALCOLM RIGBY

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Jan-June

FOREWORD

Meteorological Abstracts and Bibliography is a monthly publication whose purpose is to bring to the attention of meteorologists current literature in their field and in related fields and to provide bibliographic information on various subjects, as interest demands.

Part I contains abstracts of current literature in the fields of meteorology, oceanography, etc., arranged according to the Universal Decimal Classification.

Part II of each issue comprises an annotated bibliography of important references on a special subject (usually arranged chronologically). No attempt is made to prepare exhaustive bibliographies; instead, the aim is to include a representative cross section of the various aspects of a subject.

Bibliographies published in the successive issues were:

Vol. I, 1950

1. Atmos. Pollution	2. Aerobiology	3. Cloud Physics	4. Hail
5. Tornadoes	6. Volcanic Dust	7. Climat. Changes	8. Thunderstorms
9. Icing	10. Acoust. Propagation	11. Evaporation	

Vol. II, 1951

1. Extended Forecast.	2. Long Range Forecast.	3. Soil Temp.	4. Constants, etc.
5. Clim. of Near East	6. Clim. of Middle East	7. Special Winds	8. Radar Storm Detect.
9. Condensation Trails	10. Clim. of N.E. Africa	11. Mountain Met.	

Vol. III, 1952

1. Clim. of N.W. Africa	2. Carbon Dioxide	3. Clim. of Argentina, etc.	4. Dew
5. Objective Forecast.	6. Stratus Forecast.	7. Urban Climatology	8. Clim. of C. Africa
9. Visibility	10. Glaze and Rime	11. Free Air Turbulence	

Vol. IV, 1953

1. Turbulence Theory	2. Turbulent Diffusion	3. Frost	4. Clim. of Australia, etc
5. High Level Winds	6. Winds in Stratosphere	7. Jet Stream	8. Radiation Bioclim.
9. Clim. of Pacific	10. Auroras	11. Sferics	

Vol. V, 1954

1. Oceanog. Met.	2. Clim. of S.E. Asia	3. Auroral Physics	4. Tropopause
5. Balloons	6. Numerical Forecast.	7. Radiation Data	8. Vertical Motion
9. Clim. of Arctic	10. Industrial Met.	11. Wind Waves and Swell	

Vol. VI, 1955

1. Bibliog. of Bibliog.	2. Texts & Monogr. Bibliogs.	3. Storm Surges
4. Ionospheric Prop.	5. Photochem.—Upper Atmos.	6. Cloud Physics
7. Radar Cloud Physics	8. Atmos. Nuclei (1841–1950)	9. Atmos. Nuclei (1951–1955)
10. Weather Modification	11. Cooling Power	

Vol. VII, 1956

1. Synoptic Met.-Arctic	2. Clim. of Enclosed Spaces	3. Cosmic Rays (–1952)
4. Cosmic Rays (1953–56)	5. Atmos. Radioactivity	6. Inversions
7. Snow Micromet.	8. Snow Micromet. (Suppl.)	9. Tropical Cyclones
10. Hurricane Damage	11. Tropical Cyclone Theory	

Vol. VIII, 1957

1. Solar Weather Relations	2. Night Airglow	3. Forecasting Special Elements
4. Forest Micrometeorology	5. Hydromet. Forecasting	6. Numerical Forecasting (Suppl.)
7. Albedo	8. Meteors	9. Tropospheric Propagation (–1952)
10. Tropospheric Prop. (1953–57)	11. Medical Meteorology	

Other bibliographies in preparation are:

Actinometers	*Ozone*	*Singularities*
High Atmosphere Temperatures	*Radio Astronomy*	*Sunspots and Solar Physics*
Microwave Propagation	*Radioactivity*	*Synoptic Aerology*

Part III contains a listing of reviews, translations, reprints, and the contents of important publications. These are published in the earliest issue where space permits.

Part IV is made up of author, subject and geographical indexes. The December issue comprises cumulative author, subject, geographical and journal indexes.

EXPLANATIONS

Location of material: For each entry, a symbol is given for at least one library where the material may be found. The Union List of Serials (Gregory) is the source of most of the symbols used. In some cases, where no symbol has been assigned to a library, one will be devised according to the principles of the Union List.

Library symbols used frequently may be found in the following list:

DA:	U. S. Dept. of Agriculture Library, Washington, D. C.
DBS:	U. S. Bureau of Standards Library, Washington, D. C.
DGS:	U. S. Geological Survey Library, Washington, D. C.
DLC:	Library of Congress, Washington, D. C.
DN-HO:	U. S. Navy Hydrographic Office Library, Suitland, Md.
DNLM:	U. S. National Library of Medicine, Washington, D. C.
DSI:	Smithsonian Institution Library, Washington, D. C.
DWB:	U. S. Weather Bureau Library, Washington, D. C.
GB-MO:	Great Britain, Meteorological Office Library, Harrow, England.
MH-BH:	Harvard University, Blue Hill Observatory Library, Milton, Mass.

Other symbols:

*	before an entry indicates a good data source.
†	before an entry indicates a good bibliography.
§	before an entry indicates a synoptic case history study accompanied by charts.

Geographic locations are in the English form rather than the form used locally, for example Moscow for Moskva.

Titles of articles or monographs are in the language of the original article unless otherwise stated. Slavic (Cyrillic) titles are transliterated into the Roman alphabet according to the Library of Congress transliteration scheme.

Abbreviations:

Titles of periodicals are not abbreviated, as a rule.

The months of the year from March to July are not abbreviated. Other months are abbreviated as Jan., Feb., Aug., Sept., Oct., Nov., and Dec.

The word or abbreviation for Volume (Tom, Band, Jahrgang, Año, etc.), for Number (Heft, Fascicule, Vypusk, etc.) and for page or pages is omitted from most entries. Thus an entry will read as follows:

Meteorologische Rundschau, 2(5/6):146–151, May/June 1950.

This indicates that the article appeared in *Meteorologische Rundschau*, *Jahrgang* 2 (Vol. 2), *Heft* 5/6 (No. 5/6), *pages* 146–151, May/June 1950.

PART I. ABSTRACTS OF CURRENT METEOROLOGICAL MATERIAL

MAJOR GENERAL WORKS

COLLECTED WORKS

9.1–1 551.579:628.1(08)

American Association for the Advancement of Science, **Water for industry: a symposium presented on Dec. 29, 1953.** Ed. by Jack B. Graham and Meredith F. Burrill. Its *Publication*, No. 45, **1956.** 131 p. figs., tables, bibliogs. **DWB** (628.5 A512w), **DLC** (TD223.A467 1953)—A dozen papers on water supply, water requirements, waste disposal from normal and from atomic energy installations, future resources and requirements (both in the near and distant future) and related problems affecting the U. S. are presented in this volume. Rain making, precipitation, drought, the hydrologic cycle, use of salt water, etc. are among problems touched on briefly. Water supply is said to be abundant and relatively stable in the U. S. but demands are increasing rapidly and in places exceed supply. Variability in space and time does create a serious problem even though no long period trends are evident. *Subject Headings:* **1. Water supply conference. I. Paulsen, C. G.**—*M.R.*

9.1–2 551.501.7(02):551.507.362:629.12

Bates, D. R. and Moore, Patrick (*eds.*), **Space research and exploration.** With introduction by A. C. Clarke. London, Eyre and Spottiswoode, **1957.** 224 p. 24 figs., 26 tables, refs. at end of each ch., eqs. **DLC** (TL790.B3 1957)—This book covers the whole theory of rockets and space ships. A. C. Clarke describes development of rockets and missions which space vehicles might carry out. It needs a ton of take-off mass to enable a lb of matter to escape from earth's gravitation field. Obstacles are steadily being overcome. P. E. Cleator describes history of rockets, J. Humphries rockets and rocket propellants, D. R. Bates (p. 55–70) exploration of the upper atmosphere—composition, thermal structure, ozone layer. In recent years rockets have been extensively employed in U. S. and other locations are planned. Chemical reactions in the upper atmosphere are described. L. R. Shepherd goes into cosmic radiation and nuclear collisions, π-mesons and μ-mesons. Primary particles must be studied at very high altitudes and outside the atmosphere. The total ionization of living tissues exposed to cosmic rays above the atmosphere is about the level of tolerance, increasing with distance from the earth. M. W. Ovenden dealt with meteor hazards beyond the atmosphere. With a hull thickness $>1/10''$ a satellite a few tens of yds in diameter will have a lifetime of a few months, one of a yard of many years. H. S. W. Massey discusses the U. S. Earth satellite program of the IGY, R. A. Smith the possibility and difficulties of a manned satellite, D. F. Lawden the complicated subject of Interplanetary orbits, and J. G. Porter difficulties of space navigation. A. E. Slater deals with medical and biological problems—excessive acceleration, weightlessness (which cannot be tolerated for more than a fraction of a minute without training), respiration, food and harmful radiation. P. Moore, **Conditions on the moon and nearer planets,** says the moon is very inhospitable, with an atmosphere of ground density less than 1/10,000 that of the earth. Venus is almost as hostile. Mars is more inviting but the atmosphere is mainly CO_2 and Nitrogen, not breathable. Mercury and the outer planets are impossible. There are 16 Appendices, including theoretical considerations regarding the altitude distribution of the atmosphere and several dealing with meteors, and a concluding survey by D. R. Bates. *Subject Headings:* **1. Rockets 2. Satellite observatories 3. Interplanetary flights. I. Clarke, A. C. II. Cleator, P. E. III. Humphries, J. IV. Bates, D. R. V. Shepherd, L. R. VI. Ovenden, M. W. VII. Massey, H. S. W. VIII. Smith, R. A. IX. Lawden, D. F. X. Porter, J. G. XI. Slater, A. E. XII. Moore, P.**—*C.E.P.B.*

9.1–3 551.594:061

†Conference on Atmospheric Electricity, Portsmouth, New Hampshire, May 19–21, 195 **Proceedings,** ed. by R. E. Holzer and Waldo E. Smith. *U. S. Air Force. Cambridge Resear Center, Geophysical Research Papers,* No. 42, Nov. **1955.** 247 p. numerous figs., tables a eqs. Bibliog. at end of each chapter. **DLC**—The 27 papers read at this conference a presented in this volume are to be abstracted separately. The 3 sessions dealt with atmosphe electric phenomena (large ions, potential gradients, atmospheric radioactivity, air-ear currents, winds and space charge effects, etc.) and with thunderstorm electricity. At least scientists from all over the world participated. (For listing of contents, *see* Pt. III, p. 4 March 1956, *MAB.*) *Subject Heading:* **1. Atmospheric electricity conferences. I. Holze Robert E.** (*ed.*) **II. Smith, Waldo E.** (*ed.*).—*M.R.*

9.1–4 551.515.21(0

Tropical Cyclone Symposium, Brisbane, Dec. 10–14, 1956. **Proceedings.** Melbourn Director of Meteorology, Dec. **1956.** 436 p. figs., tables, refs. **DWB**—Over 30 papers 65 participants from countries at the conference held at Brisbane in Dec. 1956 are present in a fine edition arranged according to the special sessions under the following headin 1) The occurrence of tropical cyclones, 2) Methods of analysis and forecasting, 3) Structu 4) Modern methods of detection, 5) Formation and development, 6) Movement, 7) Aircr reconnaissance, 8) Sea disturbance associated with cyclones, and 9) Trends in forecasti Each session's papers are followed by a discussion by numerous participants. The fi paper in each session comprised a review of the present status and progress in that spe field. (For listing of contents, *see* Pt. III, p. 1016, July '57, *MAB.*) Individual artic abstracted separately. *Subject Headings:* **1. Tropical cyclone symposium 2. Tropical cycl research 3. Australia. I. Australia. Bureau of Meteorology.**—*M.R.*

9.1–5 551.510.535:551.594.7(

Wait, James R. (*Natl. Bureau of Standards, Boulder, Colo.*), **Introduction to the V papers.** *Institute of Radio Engineers, N. Y., Proceedings,* 45(6):739–740, June **1957. DL** Thirteen out of 47 papers presented at the Boulder, Colo. symposium on VLF propaga Jan. 23–25, 1957 are presented in this issue of the **IRE.** Most of them deal with noise f atmospherics and with international standards for ionospheric propagation. The introduc paper summarizes the subsequent papers. *Subject Headings:* **1. Ionospheric VLF propaga 2. Sferics 3. Radio propagation symposium.**—*M.R.*

TEXTBOOKS

See also: **Aeronautical met. textbooks** (Shtal'), 9.1–97.

9.1–6 551.594

†Chalmers, John Alan, **Atmospheric electricity.** London, Pergamon Press, **1957.** 3 64 figs. (incl. photos), bibliog. p. 287–318, eqs. **DLC** (QC961.C46 1957)—The present ed is just double the size of the author's 1949 book by the same title, and is almost compl re-written because of the rich supply of new research (since World War II) reported i voluminous literature cited (over 600 refs.). All of the aspects of atmospheric electricit treated systematically, except for the special fields of aurora, ionospheric propagation, earth currents. The several chapters cover: 1) History; 2) General principles; 3) Atmosp ions; 4) Vertical potential gradient; 5) Conductivity of air; 6) Air-earth currents; 7) P discharge currents; 8) Precip. currents; 9) Transfer of charge; 10) Thunderstorm electr 11) Lightning discharges; and 12) Charge separations. Literature through 1956 is An excellent subject index is appended. (For abstract on earlier work of same title, *see* 6 June 1950, *MAB.*) *Subject Heading:* **1. Atmospheric electricity textbooks.**—*M.R.*

9.1–7 551.59

†van de Hulst, Hendrik, **Light scattering by small particles.** N. Y., John Wiley; Lo Chapman & Hall, **1957.** 470 p. 193 figs., 46 tables, bibliog. at end of each ch., num eqs. (*Structure of Matter Series,* ed. by Maria Geoppert Mayer.) Price: $12.00.

(QC431.H8)—This new and comprehensive text contains 21 chapters divided into 3 main parts: I. Basic scattering theory; II. Special types of particles, and III. Applications. In the first part, wave propagation in a turbid medium, polarization of light, and other basic theory are considered. Pt. II goes into refractive index of small particles, spheres, ellipsoids, cylinders, large particles, optics of raindrops (p. 228–266), flat reflecting particles and Pt. III into extinction, aerosols and, finally, meteorological applications (p. 414–439), including haze optics, smoke from volcanoes and forest fires, cloud, fog and rain optics, radar meteorology, etc. The final chapter (440–444) takes up planetary atmospheres, zodiacal light, interplanetary dust, etc. *Subject Headings:* **1. Optics of small particles 2. Atmospheric optics 3. Textbooks on optics.**—*M.R.*

9.1–8 551.574.1(02)

*†Grabovskiĭ, Rostislav Ivanovich, **Atmosfernye iadra kondensatsii.** [Atmospheric condensation nuclei.] Ed. by P. N. Tverskoĭ. Leningrad, Gidrometeorologicheskoe Izdat-vo, 1956. 163 p. 43 figs., 35 tables, 172 refs., eqs. **DLC** (QC918.G7)—A book devoted to the discussion of and presentation of data on the nature, origin, distribution and effects of condensation nuclei in the atmosphere. The text is intended for students and workers in meteorology but should also be useful for workers in oceanography, geology, agronomy, bioclimatology and geophysics who are directly or indirectly concerned with atmospheric aerosols. Separate chapters are concerned with: 1) methods of measurement of condensation nuclei in atmosphere; 2) distribution of condensation nuclei at surface, aloft, and with changing synoptic or dynamic meteorological conditions; 3) results of research on nature of nuclei; 4) theories of origin of condensation nuclei in atmosphere and balance of condensation nuclei in atmosphere. In the introduction, cloud physics, physico-chemical relations and sublimation nuclei are discussed. *Subject Headings:* **1. Condensation nuclei textbooks 2. Cloud physics 3. Condensation nuclei bibliographies.**—*M.R.*

9.1–9 551.5:629.13(02)

Regula, Herbert, **Elementare Wetterkunde.** [Elements of meteorology.] Frankfurt a. Main, Akademische Verlagsgesellschaft, **1956.** 134 p. 101 figs. (incl. photos), tables, 27 refs. (*Luftfahrt-Meteorologie* by H. Regula and W. Zimmerschied, Vol. 1.) **DLC** (TL556.R35)—This volume takes up in textbook style and based on the latest information and techniques, the basic principles of meteorology which would be useful for students of aeronautical meteorology. The 14 chapters are grouped under 3 main heads: A—Physics of the atmosphere; B—Aviation meteorology factors, and C—Weather reporting and weather maps. In Pt. A the structure, composition, properties (physical constants), water vapor, altimetry, the normal or standard atmosphere, stability and lability, radiation and planetary temp., are covered. In Pt. B the wind, turbulence and precip., visibility, icing, and thunderstorms are discussed; in Part C the details of weather reporting, transmission and analysis of weather maps are treated. The book is well and cleverly illustrated. *Subject Heading:* **1. Aeronautical meteorology textbooks.**—*M.R.*

9.1–10 51(02) 551.509.313(02)

Sutton, Oliver G., **Mathematics in action.** 2d ed. London, G. Bell, **1957.** 236 p. 54 figs., refs., eqs. **DWB** (510.4 S967m)—A textbook for laymen and junior college students interested in applications of mathematics to science. Chapters cover history and philosophy of mathematical physics, basic aspects from algebra through differential equations and Laplacian mathematics, ballistics, wave mathematics, Fourier Series, aerodynamic application, statistical applications and, finally, numerical forecasting. The last part of this chapter contains a fine example of a numerical forecast compared with actual observed synoptic pattern, plus a discussion of the principles of numerical prediction. (For abstract on the 1st ed., see 5.10–90, Oct. 1954, *MAB.*) *Subject Headings:* **1. Mathematics in meteorology 2. Numerical forecasting 3. Applied mathematics textbooks.**—*M.R.*

9.1–11 551.583.3:016

†Charlesworth, John Kaye (*Queens Univ., Belfast*), **The quaternary era with special reference to its glaciation.** London, Edward Arnold, **1957.** 2 vol. (1700 p.) 326 figs., tables,

bibliog. at end of each chapter. Quaternary era bibliog., p. 1556–1601 (1924 titles). **DLC** (QE696.C53 1957, Sci. R. R.)—This is the type of book that comes out only once in a decade in any given field. It represents a systematic survey of the pertinent facts or data contained in nearly 2000 articles from hundreds of sources. Among the 50 odd chapters are a number on purely meteorological or climatological aspects of the quaternary period, including recent climatic changes and glacial advances or retreats. Other chapters discuss snow, ice, permafrost, sea level, volcanism, glaciation of the British Isles and of various localities, glacial lakes, geochronology of quaternary, stratigraphy, plant, animal and human life, etc. Specifically Ch. 1) discusses snow, snowline and avalanches; 2) glacier structure, névé, firn; 3) ablation; 4) classification of glaciers; 5) ice motion and temperature; 6) meteorological periodicities, sunspots, glacier oscillations and their cause; 7) shelf ice; 8) drift ice; 9–15) erosion by glaciers; 16–25) deposition; 26) loess; 27) cryoturbation; 28) sea ice action; 29–31) Pleistocene meteorology and climatology; 32) world glaciation; 40) periglacial conditions; 41) pluvial belts; 49) postglacial climatic changes; 50) chronology; and 51) causes of glacial period. The formidable bibliography, detailed index and hundreds of reference citations at the end of each chapter make this an outstanding contribution to the bibliography of the subject. *Subject Headings:* **1. Quaternary glaciation 2. Climatic changes 3. Glacial climates 4. Pleistocene climatology 5. Bibliography on glacial climates.**—*M.R.*

TRANSLATIONS

†9.1–12 551.510.535:551.507.362(02)

Burgess, Eric, **Raketen in der Ionosphärenforschung.** [Rockets in ionosphere research.] Foreword by Sir Harold Spencer Jones and Leo Brandt. Garmisch-Partenkirchen, Deutsche Radar-Verlagsgesellschaft, **1956.** 192 p. 112 figs. (incl. photos), 11 tables, bibliog. p. 189–192. Trans. from English of his **Frontier to space,** pub. London, **1955.** (*See* 6.10–5, Oct. 1955, *MAB.*) *Ausschuss für Funkortung: Lehrbücherei der Funkortung,* Vol. 4. **DLC** (QC879.B845)—A nicely edited translation of Eric Burgess' **Frontier to space,** containing 8 chapters on: 1) preparation for ascents, 2) investigations of the atmosphere (auroras, ionospheric sounding, night airglow, zones of silence, noctilucent clouds, radiosondes, rocket trajectories, windows in the atmosphere, corpuscular radiation), 3) rocket ascents, 4) physics and medicine of the high atmosphere, 5) the ionosphere, 6) solar radiation, 7) cosmic rays and cosmic dust and 8) artificial satellites. The illustrations are well reproduced and the table of contents much more detailed than in the original. Review by G. R. Haake in *Zeitschrift für Meteorologie,* 10(5):159, May **1956.** *Subject Headings:* **1. Rocket soundings 2. Satellite observatories 3. Upper atmospheric physics 4. Translations.**—*M.R.*

POPULAR SCIENCE BOOKS

See also: **Bioluminescence of the sea** (Tarasov), 9.1–83; **Met. in aviation** (Shtal'), 9.1–97.

9.1–13 551.510.535

Chestnov, F. I., **Zagadka ionosfery.** [The riddle of the ionosphere.] Moscow, Gosud. Izdat. Tekhniko-Teoreticheskoĭ Lit-y, **1956.** 62 p. 25 figs., refs. (*Nauchno-Populiarnaia Biblioteka,* No. 70.) **DLC** (QC880.C45 1956)—A popular scientific pamphlet discussing (with schematic illustrations) the basic features of the ionosphere—the causes of the ionization, the 4 layers (D, E, F_1 and F_2) of the ionosphere and their structure; twilight phenomena, light of the night sky, the aurora, ionospheric storms, sunspots, etc.; radio propagation by ionosphere, short wave and radio echo sounding, forecasting radio weather, eclipse effects, radio astronomy, rockets, new methods of ionospheric research, the IGY. The last chapters contain some recent material not included in the 1954 edition. (*See* 6D–235, April 1955, *MAB.*) *Subject Headings:* **1. Ionospheric structure 2. Ionospheric layers 3. Ionospheric radio wave propagation 4. International Geophysical Year, 1957–1958.**—*M.R.*

9.1–14 551.510:523.43

Levitt, Israel Monroe (*Dir. Fels Planetarium of Franklin Inst.*), **A space traveler's guide to Mars.** N. Y., Henry Holt, **1956.** 175 p. figs., 25 refs. **DLC** (QB641.L426). Review

by Robert Fleischer in *Scientific Monthly*, 84(4):214–215, April **1957. DLC**—In the eight chapters of this popular science book, the story of the investigations of the physical characteristics (motions, seasons, climate, temperatures), the moons, the surface features, the atmosphere, possibility of life and evaluation of the solar system are treated. All people on earth are said to be space travellers in the sense that they are on a whirling planet moving through space. However, Mars is the nearest "land" and so the one most likely to be visited. *Subject Headings:* **1. Martian atmosphere 2. Planetary atmospheres.**—*M.R.*

9.1–15 551.46

Muromtsev, Alekseĭ Mikhaĭlovich, **Mirovoĭ okean.** [World ocean.] Leningrad, Gidrometeorologicheskoe Izd-vo, **1956.** 85 p. figs., tables. (*Nauchno-Populiarnaia Biblioteka.*) **DLC** (GC21.M8)—A popular science treatise on the oceans, bottom relief, islands, coasts, deep sea phenomena, climate (p. 42–50), processes going on in the ocean (p. 50–70) including currents, waves, ice, etc., and economic importance of the oceans. *Subject Headings:* **1. Oceanography 2. Popular oceanography.**—*M.R.*

9.1–16 551.578.4

Bell, Corydon, **The wonder of snow.** N. Y., Hill and Wang, **1957.** 269 p. 30 figs., 12 plates (photos). **DWB** (M78.4 B433w) —A readable, popular scientific book on all manner of snow phenomena from avalanches, blizzards and record snow storms to snow crystals, graupel and frost, snow surveying, water supply from snow, etc. Excellent photographs and drawings show snow cornices, glaciers, blowing or drifting snow, cloud seeding effects on supercooled clouds, the Mt. Washington Observatory, and artificial snow crystals. Emphasis is placed on the more exciting or poetic aspects of the science, such as expeditions to the Antarctic or mountain glaciers, cloud seeding to create artificial snow, etc. but even the more humdrum aspects are dramatized so as to appeal to the popular reader. (*See* 8.10–10 for juvenile book by Thelma and Corydon Bell.) *Subject Headings:* **1. Snow phenomena 2. Popular science books.**—*M.R.*

MONOGRAPHS

See also: **Sailing directions for northern U.S.S.R.** (U. S. Hydrographic Off.), 9.1–57; **Air pollution bibliog.,** 9.1–75; **Atmospheric pollution bibliog.** (Cincinnati Univ.), 9.1–76; **Lightship observation data** (Hamburg. Seewetteramt), 9.1–87; **Aircraft icing** (Rohan, Ohaonghusa), 9.1–100; **Forest influences on precip.** (Paszýnski), 9.1–107; **Equivalent velocities for Beaufort estimates** (Verploegh), 9.1–120; **Aerological data, Japan,** 9.1–129; **Instrumentation for determination of ionospheric electron density** (Haycock), 9.1–176; **Sporadic E layer** (Smith), 9.1–177; **Zonal circulation** (Trenkle), 9.1–186; **Space-time variations in wind** (Plagge, Smith), 9.1–230; **Climate of Mozambique** (Espírito Santo), 9.1–268; **Climate of Sardinia** (Pinna), 9.1–269; **Climatic summaries, Canada,** 9.1–270; **Rainbow and corona phenomena** (Balastèr), 9.1–282.

9.1–17 551.557:551.506.7

§*Barbé, G. D., **Mesure précise du vent en altitude a l'aide de sondages rapprochés dans le temps.** [Precise measurement of upper air winds by frequent soundings.] *France. Météorologie Nationale. Monographies*, No. 3, March **1957.** 81 p. 55 figs., 51 tables, eqs. **DWB**—A detailed synoptic analysis of winds aloft based on frequent upper air soundings at Trappes with automatic radar (10 cm). Sixty soundings were made between Jan. 16 and 27, 1956. A jet stream situation was studied in its fine (time) structure by means of hourly soundings for 24 hrs (Jan. 25–26, 1956). Another study was made of the fine structure (vertical) by taking readings every 10 sec (60–90 m height). This showed remarkably sharp changes in speed above the wind maximum. Surface and upper level synoptic charts and cross sections, time graphs, cloud pictures (jet stream clouds), recorder records and extensive tables of data make this a most useful monograph. *Subject Headings:* **1. Upper air wind studies 2. Jet stream structure 3. Serial soundings 4. Automatic rawin records 5. Trappes, France.**—*M.R.*

9.1–18 551.575.36:551.509.317

§*Bintig, P. and Markgraf, H., **Nebel in der Deutschen Bucht.** [Fog in the German Bight.] *Hamburg. Seewetteramt, Einzelveröffentlichungen*, No. 14, **1957.** 23 p. 14 figs., 5 tables, 12 charts, 17 refs. Pt. 1, Bintig, P.: **Das Nebelvorkommen bei den Feuerschiffen.** [Occurrence of fog around light ships.] Pt. 2, Markgraf, H.: **Synoptisch-aerologische Untersuchungen verbreiteter Dauernebel der südlichen Nordsee.** [Synoptic-aerological investigations of fogs of long duration in the southern North Sea.] **DWB**—Seven years of continuous (24-hourly) observations (1946–52) at German Lightships "Elbe" (54°N, 8°10′E), "P-11(8)" (54°16′N, 7°11′E) and "S-2" (54°N, 03°32′E) are analyzed for fog frequencies under varying synoptic conditions. A total of 48–49 days of fog per year were recorded at the "Elbe" and 31–32 days a year at the other two lightships which lay farther from the coast. The yearly regime of fogs of 24 hr and of 12 hr duration at each of the 3 ships is shown in a table. The greatest number of persistant fogs is in March. The synoptic-aerological analysis differentiates the fogs into 6 types: 1) radiative fog over the sea, 2) land formed radiation fog, 3) warm air fog, 4) cold front fog, 5) occlusion fog, and 6) fog in connection with fronts moving from the S.W. Warm air fog is the most frequent type of those analyzed (10 out of 27 cases). Examples are given for each type—including synoptic charts, sounding diagrams, tables showing surface conditions at all stations and ships in the region, etc. Frequency data are also shown graphically by numerous histograms and curves as well as tables of monthly and hourly values, and analyses by wind direction, etc. *Subject Headings:* **1. Fog frequency studies 2. Fog in the German coast 3. Lightship observations 4. German lightships 5. North Sea Coast, Germany.**—*M.R.*

9.1–19 551.521.3:551.574.1

†Bricard, J., **Diffusion des radiations par les gouttes d'eau en suspension dans l'atmosphère.** [Diffusion of radiation by water droplets in suspension in the atmosphere.] *Handbuch der Physik*, Berlin, 48:329–369, **1957.** 23 figs., 9 tables, numerous foot refs., 18 eqs., bibliog. p. 369 (9 refs.). **DWB** (551.03 N236)—The development of the theory of dispersion of electromagnetic radiation by a drop of water or a cloud of droplets is treated in great detail. Theory based on laws of reflection, refraction and diffraction; special cases, experimental verification, transmission in different wave lengths by a diffusing atmosphere, diffusion by drops (fog, cloud, rain); theories of FRITZ, CHANDRASEKHAR and others, are taken up in successive chapters. Experimental results are presented along with theory and included in nomograms and tables. *Subject Headings:* **1. Diffusion by droplets 2. Diffuse radiation.** —*M.R.*

9.1–20 551.586:551.585:577.4

*†Daubenmire, R. (*Dept. of Botany, State College of Wash., Pullman*), **Climate as a determinant of vegetation distribution in eastern Washington and northern Idaho.** *Ecological Monographs*, Durham, N. C., 26(2):131–154, April **1956.** 14 figs., 2 tables, numerous refs. **DLC**—The various schemes of classification of climate from an ecological point of view are thoroughly and critically reviewed—those based on evaporation, on temperature and on a combination of temp., precip. and evaporation being discussed separately. Data used in the study are obtained from 44 regular U. S. Weather Bureau (cooperative) stations in eastern Washington and northern Idaho. The four main universal systems (KÖPPEN, 1936; THORNTHWAITE, 1931 and 1948; SWAIN, 1938) are compared in a table for the 44 stations in the vegetation belts. It is easily seen that there is very little homogeneity of vegetation within any of the climatic types or of climatic types within any of the natural vegetation belts. Hence a different approach—that of polygraphs of precip. against temp. for all stations in a given vegetation zone—is demonstrated. This shows good differentiation in some cases—the graph containing the envelope for one vegetative zone having superimposed on it the envelope of another zone to show how much overlapping occurs. Other methods of differentiation were tried unsuccessfully. Summer climates of a score of stations in two vegetation belts—one at 4100–7500 ft elevation (spruce-fir) and the other at 1600–3200 ft (cedar-hemlock) are compared as to mean monthly temp. and precip. For the spruce-fir ecotone, temperature seems to be the critical factor. For other ecotones drought appears to be more critical than temp.

Median rather than mean monthly precip. was found to be the most sensitive parameter for moisture. The range of climatic conditions in the area involved by this study (hot semi-desert to cold mesophytic forest) is sufficient to give a good basis for testing climatic indices against vegetation. An extensive bibliography is included. *Subject Headings:* **1. Ecoclimatology 2. Climate and vegetation zones 3. Climatic classification schemes 4. Eastern Washington 5. Northern Idaho.**—*M.R.*

9.1–21 551.541:551.558.21

*†Holmboe, Jörgen and Klieforth, Harold, **Investigations of mountain lee waves and the air flow over the Sierra Nevada.** California. Univ. at L. A. Dept. of Meteorology, Contract AF 19(604)-728, Final Report, March **1957.** 290 p. figs. (incl. photos), tables, bibliog. at end of most chapters, eqs.—Results of analysis of data collected between 1950 and 1955 in the Sierra Nevada region and of synoptic analyses of cross-mountain flow patterns. Geographical and topographical factors, equipment, techniques and data from cloud photography, from radiosondes, from power aircraft, and sailplanes are discussed in Ch. 1; reduction procedures in Ch. 2; vertical cross sections and soundings in Ch. 3; rotor flow studies in Ch. 4; synoptic conditions, including nicely analyzed charts, in Ch. 5; the 1955 observations in Ch. 6; classification of flow types in Ch. 7; mountain waves and jet streams in Ch. 8; pressure fields and altimeter errors in Ch. 9; turbulence observations in Ch. 10; flight hazards of mountain waves in Ch. 11; and theory of stationary flow over a mountain in Ch. 12. Two appendices treat of 1) reduction of tracking data and 2) altimetry. The analyses are accompanied by scores of beautiful photographs of clouds as well as equipment in operation and many sounding diagrams, synoptic charts, cross sections, flow charts and such. Ch. 10 and 11 were prepared by J. Kuettner and Ch. 12 by Holmboe. *Subject Headings:* **1. Lee waves 2. Sierra Wave Project 3. Altimeter errors 4. Rotor clouds 5. Sierra Nevada, Calif. I. Kuettner, J.** —*M.R.*

9.1–22 551.574.7:629.13

†*Jailer, Robert W. (*American Power Jet Co.*), **Evaluation of Northern Hemisphere icing probabilities.** U. S. Wright Air Development Center, Ohio, Contract AF 33(616)-2605, WADC Technical Note, 55–225, June **1955.** 20 p. 5 figs., 43 refs. **DWB** (M74.7 J25e)—Literature on upper air temperatures, cyclones, clouds, icing and thunderstorm frequency throughout the Northern Hemisphere is analyzed and all available data summarized to provide charts of frequency of low level icing probability in 5° squares over the N. Hemisphere from 20° to 75°N, for Jan., April and Oct., and similar charts for probability of thunderstorm for the cold and warm seasons. Methods are discussed along with interpretation of data. The maximum probability of icing was considered to be at 15,000 ft above terrain. Data were obtained from U. S. W. B. and U. S. Air Weather Service publications and archives. *Subject Headings:* **1. Icing probability charts 2. Thunderstorm frequency charts 3. Northern Hemisphere.**—*M.R.*

9.1–23 551.510.52:551.521

Korb, Günther; Michalowsky, Johannes and Möller, Fritz, **Investigations on the heat balance of the troposphere.** Mainz. Johannes Gutenberg Universität. Meteorologisch-Geophysikalisches Institut, Contract AF 61(514)-863, Technical Report, No. 1, Aug. **1956.** 93 p. 23 figs., 54 refs., 65 eqs. **DWB** (M10.52 M227t)—Many elements of the radiation balance of the troposphere are treated theoretically and empirically, using revised methods of Möller (1954) and correcting for cloud cover, etc. Energy absorption by infrared water vapor bands is also calculated and summed up for various concentrations of water vapor. Daily values for latitude and solar declination are also computed. The long wave radiation loss for each day of Jan. 1955 (0300Z) is computed and maps for Europe presented. Short-wave radiation loss is also computed and mapped. Values for wet soil, snow covered soil, ocean and atmosphere are considered. The period April 6–9, 1955 is also considered in charting values. Synoptic, cloud cover and Quickborn austausch data are used. *Subject Headings:* **1. Radiation balance of troposphere 2. Europe.**—*M.R.*

9.1–24 551.510.53:016

†Martin, Clyde D., **High altitude weather affecting background radiation.** North American Aviation, Inc., Contract AF 33(600)-24347, (Unnumbered report), April 15, **1957.** 95 p. 5 figs., 6 tables, over 500 refs. **DWB** (M10.53 M379h)—A systematic review of knowledge to date and literature on: 1) high altitude clouds (cirrus, contrails, nacreous and noctilucent clouds); 2) water vapor in the upper stratosphere and lower troposphere; 3) ozone; 4) carbon dioxide and 5) dust. Each section has a thorough bibliography and in addition there are 18 pages of supplemental bibliographies classified according to the above subject areas. *Subject Headings:* **1. Cirrus cloud bibliographies 2. Ozone bibliographies 3. Carbon dioxide bibliographies 4. Meteoric dust bibliographies.**—*M.R.*

9.1–25 551.591:551.508.92

†Middleton, W. E. K., **Vision through the atmosphere.** *Handbuch der Physik*, Berlin, 48:254–287, **1957.** 36 figs., table, numerous foot-refs., 50 eqs., bibliog. p. 287. **DWB** (551.03 N236)—A highly condensed technical presentation of the basic quantitative and theoretical knowledge of the optical properties of the atmosphere (extinction in pure and polluted air, scattering, haze); the alteration of contrast by the atmosphere; the properties of the human eye (contrast, adaptation, thresholds for point sources); visual range in daylight, colors, through telescopes, light sources, objects in a searchlight beam; effect of atmosphere on apparent colors of objects and, finally, an excellent chapter on visibility meters and photometers, instruments for measuring scattering, etc. Numerous nomograms and curves are presented for practical use. *Subject Headings:* **1. Visibility 2. Visibility meters.**—*M.R.*

9.1–26 551.594.7:621.396.8

†§Nasilov, Dmitrii N., **Radiometeorologiia: radiometody v meteorologii.** [Radiometeorology: radio methods in meteorology.] Moscow, Gosud. Izdat. Tekhniko-Teoreticheskoi Lit-y, **1956.** 215 p. 50 figs., 19 tables, 160 refs. **DLC** (QC973.N2)—A technical scientific book for meteorologists, geophysicists and radio amateurs, covering the many aspects of the recent science of radio meteorology. In the introduction four methods of sounding the atmosphere are discussed: 1) aerological, 2) optical, 3) acoustical and 4) radio methods. Atmospherics (sferics), reflection of radio waves from the ionosphere, from water drops, and from refracting layers are discussed at great length in Pt. I. In Pt. II the physical basis for radio meteorology is discussed including the role of water drops, of atmospheric dusts, etc. The relation between synoptic conditions over Eurasia and abnormal propagation conditions between points on the Eurasian Continent or between America and U.S.S.R. are treated in great detail with illustrations, tables and charts. *Subject Headings:* **1. Radio meteorology 2. Sferics 3. Tropospheric propagation 4. U.S.S.R.**—*M.R.*

9.1–27 551.511.2/3:551.515.21

§*Palmén, E., **Vertical circulation and release of kinetic energy during the development of Hurricane Hazel into an extratropical storm.** Chicago Univ. Dept. of Meteorology, Contract AF 19(604)-1293, Scientific Report, No. 14, Nov. **1956.** 49 p. 33 figs., 4 tables, 19 refs., 23 eqs. **DWB**—A synoptic-aerological analysis of Hurricane "Hazel," based on a dense network of radiosonde ascents in the eastern U. S. at 0300 and 1500 Oct. 15 and 0300 Oct. 16, 1954, is presented as a basis for a more intensive analysis of divergence, vertical velocities, precipitation in relation to divergence field, budget of kinetic energy, solenoidal circulation and release of kinetic energy. Many surface and upper air charts, cross sections, isohyetal charts and tables with computations of above elements are presented. A strong cold front was shown to cross the eastern U. S. and enter into the processes occurring at the time the tropical cyclone became extratropical. Kinetic energy production is shown to be about 19×10^{20} ergs/sec over an area of 3,660,000 sq km. Only a small amount of this energy is dissipated due to friction—most of it is exported into the general circulation of the surrounding region. *Subject Headings:* **1. Hurricane "Hazel" (1954) 2. Synoptic-aerological analysis 3. Vertical motion in hurricanes 4. Hurricane transformation into extratropical cyclones 5. Kinetic energy release in hurricanes 6. Thermal structure of hurricanes.**—*M.R.*

9.1–28 661.21

†Sakuma, S. and Nagata, T., **Physical volcanology.** *Handbuch der Physik*, Berlin, 48:982–1011, **1957.** 27 figs., numerous foot-refs., bibliog. p. 1010–1011 (28 refs.), 2 tables, 20 eqs. **DWB** (551.03 N236)—A thorough review of results obtained up to date, by old and new methods, in the study of volcanoes from the geophysical point of view, emphasizing quantitative results. Of interest to meteorologists is Sec. 2 of Pt. A (Movement of ejected materials) which deals with ascent of smoke columns and their diffusion in and by the earth's atmosphere. Temp. of lava, deformations, seismic waves, explosion waves, relation of magnitude to frequency, geomagnetic investigation, etc. are also discussed, with many interesting illustrations. *Subject Headings:* **1. Volcanology 2. Volcanic dust ejection.**—*M.R.*

9.1–29 551.584.3:551.311.31:581.5

†Salisbury, Sir Edward (*Royal Botanic Gardens, Kew*), **Downs and dunes: their plant life and its environment.** London, G. Bell, **1952.** 328 p. 100 figs. (incl. photos), tables, bibliog. p. 312–315. **DLC** (QK938.L5S33)—In this substantial treatise on dune ecology, the relation of wind velocity (p. 162–9), rainfall (p. 169–80), evapotranspiration (p. 180–7), and temperature (p. 192–5) to dune development, moisture, plant life and movement is considered. The treatment is based on data obtained in the British Isles. Seasonal variations are brought out clearly in tables and text. *Subject Headings:* **1. Sand dune development 2. Sand dune microclimatology 3. Sand dune ecology 4. British Isles.**—*M.R.*

9.1–30 551.506.3:551.583.14(436)

†*Steinhauser, F.; Eckel, O. and Sauberer, F., **Klima und Bioklima von Wien, II Teil.** [Climate and bioclimate of Vienna, Pt. 2.] Vienna, Österreichische Gesellschaft für Meteorologie, **1957.** 136 p. 29 figs., 41 tables, 10 charts (fold.), 14 refs. **DWB**—In the previous monograph (Pt. I) the long records of temperature, precipitation, wind, sunshine, soil temperature, evaporation, etc. for Vienna were presented and analyzed. In this monograph the secular changes in the various elements are analyzed, application to building and hygiene explored, and the local variations in temperature in the various parts of Vienna and vicinity treated with respect to diurnal, annual and long period variations. A future monograph will take up local variations in other meteorological elements as well. An amazing amount of graphical and tabular material, charts of the city, and other illustrative presentations are included. The sections on air pollution, comfort climate, temperature, fog, smoke and precipitation, wind roses, radiation on walls, extreme hot or cold days are unusually good, making use of elaborate frequency analyses. Review of Pt. 1–2 by H. Sebastian in *World Meteorological Organization, WMO Bulletin*, 6(3):123–124, July **1957.** (For abstract on Pt. 1, *see* 6.11–17, Nov. 1955, *MAB.*) *Subject Headings:* **1. Secular climatic records 2. Climatic variations 3. Vienna, Austria.**—*M.R.*

9.1–31 519.24

Topping, J. (*Acton Technical College, London*), **Errors of observation and their treatment.** London, Institute of Physics, (Reprinted) **1956.** 119 p. figs., 27 refs., eqs. **DWB**—(519.6 T675e)—A small monograph intended for students in technical colleges and students of physics and chemistry in the universities and upper grades of high schools. The basic types of errors in observation, statistical concepts useful in physical measurements and, finally, the theory of errors are treated in some detail. The error in too great refinement of crude data (delusions of accuracy), accidental and systematic errors, computational errors, frequency distributions, tests of significance, curve fitting, Poisson's distributions, Gaussian law of error, regression lines and coefficients, are some of the specific ideas lucidly explored in the text. Numerous examples are given. *Subject Headings:* **1. Statistical methods in computation 2. Observational errors.**—*M.R.*

9.1–32 551.515.2(73):551.509.21

§U. S. Weather Bureau, **Hurricanes: a quick reference guide to synoptic charts of hurricanes that threatened or entered the United States, 1952–1956.** Rev. June **1957.** 44 p. charts for individual hurricanes. **DWB** (M15.2 U587hq 1957)—The guide prepared in 1956 for

1954–55 hurricanes (*see* 7I–199) has been expanded to cover all major hurricanes for 1952–56 which occurred in the Eastern U. S., Western Atlantic, West Indies, Gulf of Mexico and Caribbean. An index (44 p.) facilitates location of charts for hurricanes crossing any given 5° square of lat. and long., and shows tracks and names of each one that occurred in the 5 yr period. The surface and 500 mb charts for 6-hour periods covering the life of each cyclone ("Betsy" and "Flossy," 1956; "Able," "Baker," "Charlie" and "Fox," 1952; "Barbara," "Carol," "Dolly," "Edna" and "Florence" 1953) make up the bulk of the report. It must be used in conjunction with the one for 1954–55 to be complete. Charts for 1956 are poorly reproduced, those for 1952 and 1953 excellent. *Subject Headings:* **1. Hurricane analog guide 2. Synoptic charts of hurricanes 3. Hurricanes, U. S.** (1952–56).—*M.R.*

MANUALS, ATLASES AND HANDBOOKS

See also: **Air conditioning installations for industry** (Kufferath), 9.1–110; **Synoptic aerology** (Pogosian, Taborovskiĭ), 9.1–154.

9.1–33 551.576.12:061.3

International cloud album for observers in aircraft. [Geneva], World Meteorological Organization, **1956.** 1 p. of introd. and 32 plates (some in color). **DWB** (M76.1 I61i). Also: French language edition, **Album international des nuages pour les observateurs en aeronef.** Issued **1956. DWB** (M76.1 A345aL)—This abridged edition contains 32 selected cloud photographs, ten of them representing the simpler types as seen from below, and 22 representing types as seen from above. The atlas is to serve a dual purpose: 1) to aid airways observers in reporting clouds for aviation purposes, and 2) to aid pilots in recognizing cloud forms when in flight, both for interpretation of reports and for reporting (PIREPS) while in flight. Each photograph is amply described and annotated. Many are in color. *Subject Headings:* **1. International Cloud Atlas 2. Cloud photographs 3. Airway cloud reports 4. Pilot reports. I. World Meteorological Organization.**—*M.R.*

9.1–34 551.510.535:912

Wright, J. W. and Knecht, R. W., **Atlas of ionograms, compiled for the URSI/AGI Special Committee on World-wide Ionospheric Soundings.** Boulder, Colo., Central Radio Propagation Lab., National Bureau of Standards, June **1957.** 7 p. numerous charts. **DWB** (M10.535 W951at)—A sizeable compilation of ionograms illustrate the diurnal, seasonal and geographical variations in types of records obtained by vertical sounding techniques all over the world. In Pt. I, ionograms are presented for summer and winter days, at 00, 06, 12 and 18 h local time, for 2 geomagnetically quiet days. Material is arranged by geomagnetic latitude without regard to hemisphere. In Pt. II, ionograms illustrate specific phenomena: Es types, disturbances (auroras, cosmic rays, SID's, lunar stratification multiple echoes, solar flares, etc.) and, finally, effects associated with local times or season (such as sunrise, etc.). Observation and classification techniques are specified. *Subject Headings:* **1. Ionogram atlases 2. Ionospheric records. I. International Scientific Radio Union II. I.U.G.G. Association of Geodesy.** —*M.R.*

9.1–35 551.508(02)

Leningrad. Glavnaia Geofizicheskaia Observatoriia, **Rukovodstvo po regulirovke meteorologicheskikh priborov.** [Instructions on the calibration of meteorological instruments.] Leningrad, Gidrometeorologicheskoe Izd-vo, **1956.** 33 p. 7 figs., tables, 7 eqs. **DLC** (QC876.L4)—A pamphlet giving instruction for regulating and calibrating: 1) aneroid barometers, 2) barographs, 3) thermographs, 4) hygrographs, and 5) hair hygrometers. The instruments and their components are illustrated and tables showing general accuracy of each component presented and discussed. *Subject Headings:* **1. Recording instruments 2. Instrument calibration handbooks 3. Barographs 4. Thermographs 5. Hair hygrometers.** —*M.R.*

9.1–36 912(569.4) 551.582.3(569.4)

Israel. Dept. of Surveys, [**Atlas of Israel: cartography, physical geography, history, demography, economics, education.** Pub. jointly by the Dept. of Surveys, Ministry of Labour and the Bialik Institute, The Jewish Agency. Pub. Jerusalem, **1956**–]. In Hebrew. Title transliterated: **Atlas Yisrael.** "About 100 sheets, many folded, in color, with reinforced, perforated side margin, issued in folders at the rate of two folders per year, as they accumulate. A one volume English edition to be issued on completion of the present Hebrew edition. Price of Hebrew edition, $60.00, including costs." 50 cm. Each map with text; some have bibliographies. Folder 1 (pub. 1956) contains 9 maps plus Title Page (verso in English), Introduction, and Preliminary Table of Contents (in Hebrew and English). Folder 2 (pub. 1956) contains 9 maps. Folder 1 includes Map 1, **Temperature,** of Section IV, **Climate.** (Section IV, eventually to include (2) **Rainfall,** (3) **Barometric pressure,** (4) **Wind,** (5) **Humidity, dew and evaporation;** Section V, (1) **Catchment areas. DLC** (G2235.I8 1956 MAP). Review by Karl Keil in *Met. Rund.*, 10(4):143–144, July/Aug. **1957. BWB**—The large temperature chart includes for the Near East (Asia Minor, Egypt and Greece) charts of the mean annual temp. (°C), mean temp. of the hottest and of the coldest months, and for Palestine the mean annual, mean Aug. (1°C) and mean Jan. (2°C) temperatures, and the difference between the daily maximum and minimum temps. The maps are beautifully done in many colors and are neatly drawn. Sources are given in a bibliography. Text includes bar and scatter charts of temp., precip., and humidity regime for year at 8 selected stations, a cross section of temp. vs. topography, and other analytical graphs. *Subject Headings:* **1. Atlas of Israel 2. Climatic charts of Israel 3. Climate of Israel 4. Israel 5. Near East. I. Jewish Agency for Palestine. Bialik Institute II. Amiran, D. H. K. III. Gilead, M. IV. Gordon, M.**—*M.R.*

9.1–37 551.506:629.13(02)

Kolobkov, N. V., **Aviameteorologicheskie nabliudeniia.** [Observations in aviation meteorology.] Moscow, Izdatel'stvo Dosaaf, **1954.** 175 p. 64 figs., tables. **DLC** (TL556.K6). Review by V. A. Shtal' in *Meteorologiia i Gidrologiia*, Leningrad, No. 1:57–58, Jan. **1956. DLC**—A concise manual or textbook for observers or students engaged in aviation meteorology work. Each of the main classes of instruments used at airways stations is described, its use, accuracy and maintenance treated, and the observation methods, and recording, coding and transmitting outlined. International codes for standard weather observations are given in some detail. Temp., pressure, humidity, wind, cloud, precip., snow cover, visibility, recording apparatus, pilot balloon observations and their computations, general station work, construction of synoptic charts, daily records and reports for pilots are treated in separate chapters. History of meteorology and general (synoptic) principles of meteorology are also outlined briefly. *Subject Headings:* **1. Airways observation 2. Manuals.**—*M.R.*

GENERAL GEOPHYSICS AND METEOROLOGY

GENERAL GEOPHYSICS

See: **Saha's contributions to geophysics** (Banerji), **9.1–74.**

GEOMAGNETISM

See also: **Satellite geomagnetic observation** (Katz), **9.1–96.**

9.1–38 551.2

*Jacobs, J. A. (*Geophysics Lab., Univ. of Toronto, Canada*), **The interior of the earth.** *Advances in Geophysics*, Ed. by H. E. Landsberg, 3:183–239, **1957.** 11 figs., 10 tables, 127 refs., eqs. **DWB, DLC**—Systematic review of knowledge of composition and constitution of earth, thermal history, earth's magnetic field, polar wandering, etc. as evidenced by seismic, magnetic and magneto-hydrodynamic studies during the past few years. A great diversity of results emanate from the divergent theories and scarce data. A table gives positions of poles at various geological epochs, and graphs show cooling of earth in past 4 billion years. *Subject Headings:* **1. Thermal history of earth 2. Geomagnetism 3. Magnetohydrodynamics 4. Polar displacement.**—*M.R.*

9.1–39 550.38

†Cole, G. H. A., **The earth and its magnetic field.** *Science Progress*, London, 45(180):628–645, Oct. **1957.** 50 refs. **DWB.** Summary in *Current Science*, 26(11):335–338, Nov. **1957. DLC**—"Aims to trace the modern arguments designed to explain the presence and properties of the observed magnetic field." Structure of the earth, seismic data and composition are first discussed. Pt. 2 deals with the magnetic field, first observations, including remanent magnetism of rocks, which indicates considerable wandering of poles during 800 million years, relative movements of land masses and reversals of polarity. Theories are next discussed, classified as Elementary and Theories involving electric currents. The origin of the earth's main field is still not understood but it is virtually certain that it is hydromagnetic and located in the core. *Subject Heading:* **1. Geomagnetism.**—*C.E.P.B.*

9.1–40 550.38(98):016

†Knapp, David G., **Arctic aspects of geomagnetism.** (In: **Dynamic North.** Wash., D. C., Technical Assistant to Chief of Naval Operations for Polar Projects, **1956.** Vol. 1, Pt. 12. looseleaf. 65 p. 5 figs., 2 tables, 375+ refs.) **DWB**—Numerous aspects of geomagnetic observational work in the Arctic are discussed in a most thorough manner based on a rich and accurate literature survey. The early history of geomagnetism in general (from Stephen Borough, 1556–57), and specific work in the 19th century in Alaska by the Russians, in Northern Canada by the British, in Greenland and Scandinavia, in Russia and on expeditions in the Polar Basin (such as the "Fram" of Nansen's); the First Polar Year, Second Polar Year, aircraft expeditions, recent Russian work, compass variations, etc. are covered, with good charts, tables and a magnificent reference text. *Subject Headings:* **1. Arctic geomagnetism 2. Geomagnetism bibliographies 3. Arctic expeditions 4. Arctic.**—*M.R.*

9.1–41 550.384.3

McDonald, Keith Leon (*Dept. of Physics, Univ. of Utah, Salt Lake City*), **Penetration of the geomagnetic secular field through a mantle with variable conductivity.** *Journal of Geophysical Research*, Wash., D. C., 62(1):117–141, March **1957.** 8 figs., 2 tables, 18 refs., 20 eqs. **DLC**—The work reported on here is an investigation of the radial distribution of electrical conductivity σ in the earth's mantle. Previously this function had been inferred only to about the 800-km depth from the geomagnetic transient variations of external origin (*see* Lahiri and Price). Throughout the remaining lower portion of the mantle, we make use here of the longer wave periods which characterize the geomagnetic secular variation. Choosing a power law for σ, the wave attenuation and phase retardation after propagation through the mantle are investigated, using sinusoidal input functions, and an equivalent conductivity is established on the basis of amplitude attenuation. Aperiodic models at the core are solved by the method of Laplace transforms and a time discontinuity in H_r (δ-function in H_r) is treated in detail. The elapsed time for a pulse to reach the earth's surface is expressed in terms of an equivalent conductivity. The latter quantity is then derived indirectly from a study of the time-dependent magnetic observatory records. Judged somewhat better than an order of magnitude, in these calculations, σ is shown plotted throughout the mantle. *Subject Headings:* **1. Geomagnetic secular variations 2. Electrical conductivity of earth's mantle.**—*Author's abstract.*

9.1–42 550.38:519.28

Zmuda, A. J., **Extrapolation of geomagnetic field components along a radius from the center of the earth.** *American Geophysical Union, Transactions*, 38(3):306–307, June **1957.** table, 2 refs., 12 eqs. **DWB, DLC**—An approximate method of extrapolating geomagnetic field components is presented in which a very small amount of data is required to effect the continuation. From intensity values at two points lying on a common radius from the center of the Earth, an attenuation factor is obtained which is used in an exponential formula to extrapolate to additional collinear points. *Subject Headings:* **1. Geomagnetic field components 2. Extrapolation.**—*Author's abstract.*

9.1–43 550.384:551.7

Irving, E. and Green, R., **Palaeomagnetic evidence from the Cretaceous and Cainozoic.** *Nature*, London, 179(4569):1064–1065, May 25, **1957.** 2 figs., table, 17 refs. **DWB**—

Remanent magnetism of volcanic rocks of Victoria, Australia, gives position of S. Pole as: Pliocene-Pleistocene 86.3S, 102.1E, Lr Tertiary 66.8S, 122.7E. Cretaceous and Lr Tertiary poles from European and N. American data coincide, but those from Indian and Australian observations are further from present pole and from one another. The explanation favored is that Australia and India have undergone translation and possibly rotation with respect to each other, Europe and N. America. *Subject Headings:* **1. Paleomagnetism 2. Victoria, Australia.**—*C.E.P.B.*

9.1–44 550.38

*Cullington, A. L. (*Magnetic Survey, Christchurch*), **The geomagnetic field in New Zealand at Epoch 1950–5.** *New Zealand. Dept. of Scientific and Industrial Research. Geophysical Memoir*, No. 2, **1954.** 32 p. fig. (incl. 7 maps), 21 tables, 7 refs., 4 eqs. **Vertical earth-air currents and tests of mutual consistency of D and H charts,** p. 26–32. **DLC** (QC801.N48, No. 2)—Magnetic elements for 1950–5 are given for 230 stations in New Zealand for 1941–51, and isomagnetic charts appended. Vertical earth-air currents were evaluated and CHAPMAN's criteria used to test mutual consistency of D and H charts. *Subject Headings:* **1. Geomagnetic survey 2. Air-earth currents 3. New Zealand.**—*From author's abstract.*

9.1–45 550.385

Whitham, K. and Loomer, E. I. (*both, Dominion Obs., Ottawa*), **A comparison of magnetic disturbance at Resolute Bay and Baker Lake, Canada.** *Tellus*, Stockholm, 8(2):276–278, May **1956.** 2 figs., 2 refs. **DLC**—In connection with ALFVÉN's theoretical prediction that an inner auroral zone with a polar distance of 5 to 10° exists, the author presents a comparison of the Arctic magnetic disturbances using the K-indexes at these stations. The R indexes for corresponding intervals of three hrs showed a correlation of 0.77. Also the magnetograms are compared at the time when the K index at Resolute Bay exceeds appreciably that at Baker Lake. Out of six magnetograms examined, five showed a marked agreement in the form of disturbance and as evidence for disturbances at Resolute Bay occurring independently of Baker Island. *Subject Headings:* **1. Magnetic disturbances 2. Alfvén's theory 3. K-index 4. Resolute Bay, Canada 5. Baker Lake, Canada.**—*I.L.D.*

9.1–46 550.383

Graham, John W. (*Carnegie Inst. of Wash., D. C.*), **Paleomagnetism and magnetostriction.** *Journal of Geophysical Research*, Wash., D. C., 61(4):735–739, Dec. **1956.** 3 figs., 2 refs. **DLC**—The rôle of magnetostriction in the problem of rock magnetism has heretofore been neglected. Based on some experimental observations and on reconsiderations of well-known factors affecting rocks, the conclusion is reached that magnetostriction may figure prominently in establishing the directions of magnetization observed in many cases. Therefore, the practice of interpreting meager magnetic data in terms of polar wandering and continental drift can be in error. *Subject Headings:* **1. Magnetostriction 2. Magnetization of rocks 3. Continental drift.**—*Author's abstract.*

9.1–47 550.384.4

Alexander, N. S. and Onwumechilli, C. A., **Variation of the horizontal force near the magnetic equator.** *Nature*, London, 180(4578):191–192, July 27, **1957.** 2 figs., ref. **DWB**—Nov. 25, 1956–Jan. 22, 1957, photographic records of H were taken at 9 field stations between 3°N and 3°S of magnetic equator, and at base station of Ibadan. Ratio of ranges at field and base stations showed a smooth variation with latitude but a different form of daily variation N and S of magnetic equator. Changes are attributed to superposition of a narrow (2–3°) equatorial electrojet on a more general field. *Subject Headings:* **1. Diurnal geomagnetic variations 2. Electrojet 3. Ibadan, Nigeria.**—*C.E.P.B.*

9.1–48 550.385

Nikol'skiĭ, A. P. **O geograficheskom raspredeleniĭ magnitnykh vozmushchenii v okolopoliusnoĭ oblasti Arktiki.** [Geographic distribution of magnetic disturbances in the polar region of the Arctic.] *Akademiia Nauk SSSR, Doklady*, 109(5):939–942, **1956.** 3 figs., 10 refs. **DLC**—The analysis of extensive observations of magnetic stations located in the

Arctic north of $\phi = 60°$ over a long period of time (1882–1951) has shown that isochrones of maximum magnetic disturbances occurring at dawn over high latitudes constitute a system of spirals issuing from the pole of the magnetized earth. In this article it is shown that the geographical distribution agrees well with the experiments of Bukelance in which cathode rays falling upon a magnetized sphere in air produce light in the form of a spiral situated around the magnetic pole and issuing from it and they confirm the theoretical concepts of Störmer on the movement of electrically charged particles in the pole of a magnetic dipole. *Subject Headings:* **1. Magnetic disturbances 2. Magnetic poles 3. Arctic.**—*I.L.D.*

IGY

9.1–49 551.5:550.3(99)

de Bary, Elizabeth, **Das Internationale Geophysikalische Jahr, X, Die Erforschung der Antarktis.** [The IGY, Pt. 10, The exploration of the Antarctic.] *Umschau*, 57(19):592–594, Oct. 1, 1957. fig., table. **DLC**—The first landing on the Antarctic was in 1895 but there are many gaps in our knowledge. A brief description is given of proposed stations with a map; 30 on Antarctic continent, 17 on Graham Land peninsula, and 11 on subantarctic islands. The British propose to cross from Weddell Sea via S. Pole to Ross Sea. Russians propose to winter at Pole of Inaccessibility. Meteorological reports will be collected and forecasts issued at U. S. "Weather Central" on west coast of Ross Sea. Ozone, glaciological, ionosphere and rocket investigations are briefly referred to. *Subject Headings:* **1. IGY meteorology program 2. Antarctica.**—*C.E.P.B.*

9.1–50 550.3:061.3

Meek, J. H. (ed.), **The Canadian program for the International Geophysical Year, May 1957.** Ottawa, Canada. Associate Committee on Geodesy and Geophysics, National Research Council, 1957. 95 p. 15 figs., tables. At head of t-p: Canadian National Committee for the International Geophysical Year.—A substantial report giving in outline form, with accompanying maps and tables of stations (90 in all), the details of the Canadian IGY program in every field of IGY activity. The number of stations and variety of activity at each is truly impressive. The institution and personnel responsible for the efforts in each of the 14 disciplines or branches of the program are also listed. The greatest activity will be in meteorology, geomagnetism, aurora and airglow, ionospheric propagation and glaciology. Considerable effort in rocket, cosmic ray and oceanography is also being carried on. The status as of May 15, 1957, is covered by the report. *Subject Headings:* **1. Candian participation in IGY 2. Canada. I. International Geophysical Year, 1957–1958. Canadian National Committee.**—*M.R.*

9.1–51 550.3:061.3

Godson, W. L. and Mateer, C. L., **The Canadian meteorological programme for the International Geophysical Year.** *Canada. Meteorological Division, CIR.* 2745, TEC. 229, Jan. 25, 1956. 10 p. **DLC**—The history of IGY, Recommendations of CSAGI for Meteorology, application of CSAGI recommendations to Canada, Canadian Meteorological Program for IGY, program of study of the general circulation, atmosphere ozone, the energy budget of the air-earth interface, etc., are outlined in this circular in some detail. Canada's IGY program amounts to an estimated $1.5 million, and the meteorological program about $350,000. Seven special stations near 80°W will be maintained between 58° and 82°30′N. lat., and an analysis and evaluation unit at Toronto. Glaciological work will also involve meteorological observations on the Ellesmere Island Ice Cap. *Subject Headings:* **1. Canadian participation in IGY 2. Ozone network in Canadian Arctic 3. IGY networks 4. Canadian Arctic.**—*M.R.*

9.1–52 551.506.2:06

Royal Society of London, **The United Kingdom contribution to the International Geophysical Year 1957–58.** London, 1957. 72 p. 7 figs., photo, 21 tables. **DWB**—Following a Foreword by Sir Cyril Hinshelwood, Ch. 1 is a short **Historical Introduction** and Ch. 2 **Organizational aspects,** including world and U. K. organizations, and lists of Sub-committees and "Disciplines." Ch. 3 deals with individual disciplines: 1. World days; 2. Meteorology,

including upper air, radiation, ozone, sferics, atmospheric electricity and chemistry, and list of stations; 3. Geomagnetism; 4. Aurora and airglow; 5. Ionosphere; 6. Solar activity; 7. Cosmic rays; 8. Longitudes and latitudes; 9. Glaciology; 10. Oceanography; 11. Rockets and satellites; 12. Seismology; 13. Gravity; 14. Nuclear radiation; 15. Publications. Ch. 4 describes the geographical distribution of U. K. and joint stations in all parts of the world, with maps. Finally, Ch. 5 describes the establishment of the Royal Society base at Hadley Bay, Antarctica. Review in *Weather*, London, 12(10):328, Oct. **1957.** *Subject Heading:* **1. British participation in IGY.**—*C.E.P.B.*

9.1–53 550.3:061.3

Guthrie, Janet, **The planet called earth.** *Michigan Technic*, Ann Arbor, Mich., 74(7):11–18, 52, April **1956.** photo. **DLC**—A general discussion of the IGY and U. S. participation, the Antarctic program and other scientific efforts to be made. A picture of a Nike Deacon rocket fired on June 24, 1955 at Wallops Island, Va., is included. *Subject Headings:* **1. IGY program 2. Nike Deacon rockets.**—*M.R.*

9.1–54 550.3:551.5:061.3

Kostka, Oldřich, **Meteorologický program Mezinárodního geofysikálního roku 1957–58.** [Meteorological program of the International Geophysical Year 1957/58.] *Meteorologické Zprávy*, Prague, 10(2):29–34, **1957.** fig. Russian and English summaries p. 29. **DWB**—The international meteorological program of IGY is outlined according to J. Van Mieghem. The meteorological program of Czechoslovakia is also discussed. It will include intensified synoptic surface and upper-air observations, radiation measurement (total radiation, direct solar radiation, outgoing radiation, sunshine duration), ozone measurement, chemical and radioactivity analysis of precipitation and special observation of cloudiness and of noctilucent clouds. *Subject Headings:* **1. IGY program 2. Czechoslovak participation in IGY.**—*G.T.*

9.1–55 551.593.653:550.3:061.3

Křivský, L. (*Astron. Inst., Ondrejov*), **Pozorování nočních svítících oblaků v geofysikálním roce 1957–58.** [Observation of noctilucent clouds during the International Geophysical Year 1957–58.] *Meteorologické Zprávy*, Prague, 10(2):34–36, **1957.** fig., ref. Russian summary p. 34. **DWB**—A number of stations will be engaged in the observation of noctilucent clouds in Czechoslovakia in connection with the IGY program. The coordination will be done by the Astronomical Institute at Ondřejov (near Prague). Detailed instructions are given in this article for observation, photography and reporting of noctilucent clouds. *Subject Headings:* **1. Noctilucent clouds 2. IGY program.**—*G.T.*

ARCTIC RESEARCH

See also: **Arctic geomagnetism** (Knapp), 9.1–40; **Magnetic disturbances, Arctic** (Whitham, Loomer), 9.1–45; **Geomagnetic disturbances, Arctic** (Nikol'skiĭ), 9.1–48, **Early obs. of free atmosphere** (Loewe), 9.1–123; **Gale frequencies** (Lamb), 9.1–128.

9.1–56 551.311.18(268)

Armstrong, Terence, **The ice of the central polar basin.** *Journal of Glaciology*, 3(22):105–10, Oct. **1957.** 8 figs., 12 refs. English and German summaries p. 105. **DWB**—There have been numerous landings on ice in the polar basin in recent years. Ice concentration is 9–10/10 but there are cracks and movement. On the fringes certain areas remain ice-covered while ice around melts. Currents have been computed from water samples and ice drift; there is an anticyclonic eddy north of Alaska and a central cyclonic system as well as a general drift and local movements caused by winds. Ice is added to bottoms of floes and removed from tops. *Subject Headings:* **1. Polar ice 2. Arctic.**—*C.E.P.B.*

9.1–57 551.582:656.6(57)

*U. S. Hydrographic Office, **Sailing directions for Northern U.S.S.R., Vol. 2, Mys Kanin Nos to Ostrov Dikson.** 1st ed., **1954.** Its *H.O. Publication*, No. 137B, pub. **1954.** 408 p. figs., charts (1 fold. in pocket). Loose-leaf. Also Vol. 3, **Ostrov Dikson to Mys Shmidta.**

1st ed., **1954.** Its *H.O. Publication*, No. 137C, pub. **1954.** Loose-leaf. (*See* 7.5–46, *MAB*, for abstract of Vol. 1.) **DWB** (M82/269 U58sn, 1953)—Following the pattern set in Vol. 1, the general effects of wind, ice, etc. on tides and currents are discussed on p. 33–34, ice on p. 34–89 (including discussions of warming of Arctic, navigation of ice and extensive ice glossary and specific ice conditions in several separate sectors), climatology on p. 89–103, sea temperatures and salinity, p. 103. Climatic tables for 10 stations on Arctic coasts and islands, p. 371–80 (p. 305–22 of Vol. III for 18 stations). Detailed monthly wind direction frequencies, frequency of gales, cloud amounts, days with snow and in some cases visibility at 0700, 1300 and 1900 within 3 class intervals, are given in climatic tables. A brief discussion of wind, fog, ice and weather is found in each subject section of the sailing directions, the general information sections are somewhat the same in the 3 vols. *Subject Headings:* **1. Sailing directions 2. Climate of Arctic Coast of U.S.S.R. 3. Arctic Coast of U.S.S.R.**—*M.R.*

9.1–58 551.586:581(98)

Wilson, J. Warren, **Arctic plant growth.** *The Advancement of Science*, 13(53):383–388, June **1957.** 34 refs. **DLC**—Poverty of Arctic vegetation is attributed to small amount of annual growth. On Cornwallis Is. *Salix arctica* after 20 years weighed only a few grams, due to shortness of growing season, low temperature of summer, nitrogen deficiency and lack of shelter. *Subject Heading:* **1. Arctic plant life.**—*C.E.P.B.*

9.1–59 551.525.5:63(98)

Korol, Nestor, **Agriculture in the zone of perpetual frost.** *Science*, Wash., D. C., 122(3172): 680–682, Oct. 14, **1955.** table. **DLC**—The nature of permafrost, its extent and variations in the Arctic, and its influence on agriculture are discussed at some length and the types of crops (potatoes, and vegetables, barley, oats, spring wheat and spring rye) which grow in the tundra and taiga region of Eurasia even as far north as Naryan-Mar, Narvik and Igarka and the southern slopes of the dunes on the Taimyr Peninsula (lat. 105°E), although in these places crops are a gamble or at least experimental. Grain crops do not do well over permafrost, as it shortens the growing season. Moisture may be deficient even where drainage is necessary. *Subject Headings:* **1. Arctic agriculture 2. Permafrost and crops 3. Soviet Arctic.**—*M.R.*

9.1–60 535.6:535.7:796.9

Wyszecki, Günter (*Div. of Applied Physics, National Research Council, Ottawa 2, Ontario*), **Theoretical investigation of colored lenses for snow goggles.** *Optical Society of America, Journal*, 46(12):1071–1074, Dec. **1956.** 3 figs., table, 12 foot-refs., 8 eqs. **DWB, DLC**—Safe driving or skiing in the "arctic whiteout" depends frequently upon the early detection of crevasses, fissures, ditches, or other sudden changes of elevation in the snow field. It has been believed that there might exist a certain colored glass for snow goggles which would provide a better perception of dangerous spots in snow. However, no definite answer was available as to what color the lenses ought to be. The purpose of this paper is to investigate this problem from the theoretical point of view. It is found that compared with an essentially neutral glass none of the colored glass ordinarily used in snow goggles improves the ability of the eye to detect sudden changes of elevation in a snow field. Even red glasses of extreme purity—which according to the present theory would be expected to give a maximum of improvement, are not significantly more effective than neutral glasses. *Subject Headings:* **1. Goggles 2. Skiing 3. Polar whiteout.**—*Author's abstract.*

ANTARCTIC RESEARCH

See also: **IGY exploration of Antarctica** (de Bary), 9.1–49; **Early obs. of free atmosphere** (Loewe), 9.1–123; **Gale frequencies** (Lamb), 9.1–128.

9.1–61 91.04(99)

Law, P. G., **Australian National Antarctic Research Expedition, 1956–57.** *Polar Record*, 8(57):533–534, Sept. **1957. DLC**—Account of the activities in 1956–57. New equipment installed at Mawson included an ionospheric sounder, radio tracking of meteor trails for upper wind determinations, auroral cameras, etc. At Macquarie Island an auroral camera, "whist-

ler" recorder, ozone spectro-photometer and meson telescope were installed. *Subject Headings:* **1. Antarctic expeditions. I. Australian National Antarctic Research Expeditions.**—*C.E.P.B.*

9.1–62 551.506.5(269):551.510.535(058)

*Little, A. S., **Hourly measurements of ionospheric characteristics, Macquarie Island, 1953.** *Australian National Antarctic Research Expeditions, Interim Reports*, No. 10, Jan. **1956.** unpaged. 6+11 figs., 132 tables, No. 316–446, 6 refs. Also: Firmstone, T. F., **Hourly measurements of ionospheric characteristics, Macquarie Island, 1954.** *Ibid.*, No. 12, Dec. **1955.** unpaged. 8 figs., almost entirely tables, 3 refs. Also: Callow, D. R. L., **Hourly measurements of ionospheric characteristics, Macquarie Island, 1955.** *Ibid.*, No. 13, Aug. **1956.** unpaged. 11 figs., almost entirely tables. **DWB**—Extremely detailed tabular and graphical presentation of the hourly data obtained at Macquarie Island (54°29′S, 158°58′E, Geomagnetic 61°S, 283°E). Hourly values of f°F2, f°F1, f°E, fE_s, H′F2, h′F1, h′E, h′E_s, hpF2, (M3000)F2 and M(3000)F1. Data for Sept. 1953 are missing. Records began in June 1950. *Subject Headings:* **1. Ionospheric data yearbooks 2. Macquarie Island.**—*M.R.*

9.1–63 551.509.21(269)

Radok, U., **A test of synoptic charts for the Southern Ocean.** *Meteorological Magazine*, London, 86(1023):269–272, Sept. **1957.** 2 figs. **DWB**—Daily synoptic charts of Antarctic waters often have to be drawn on insufficient information. Methods of making the best of this, and examples are given. *Subject Headings:* **1. Synoptic chart accuracy 2. Southern Ocean.**—*C.E.P.B.*

SERVICES, INSTITUTIONS AND OBSERVATORIES

9.1–64 550.3:537.59

Korff, Serge A. (*New York Univ. College of Engineering*), **Physics in South America.** *Physics Today*, 9(12):20–23, Dec. **1956.** photos. **DWB, DLC**—A country-by-country description of research facilities in physics, geophysics, astrophysics and especially cosmic ray research in South America. Many of the high altitude observatories (such as Huancayo, Peru; Chacaltaya, Bolivia; one near Santiago, Chile, etc.) are mentioned and their directors as well as those in the universities named. *Subject Headings:* **1. Geophysical observatories 2. Cosmic ray research 3. South America.**—*M.R.*

9.1–65 551.5(058)

New York Univ. College of Engineering. Research Div., **Annual Report, 1952, 1953, 1954** and **1955.** about 30 p. each. numerous photos. **DWB**—In these nicely illustrated annual reports, the work done by the Engineering Research Division in many lines of theoretical, applied and instrumental meteorology are reported and the specific work illustrated. Each year's report is slightly different in context from that for the previous year, but many of the contract research projects for the Air Force and Navy continue through 2 or more years. As an example, work in atmospheric heat balance, oscillations, winds and turbulence was reported on p. 25–26 and the dew-point hygrometer on p. 28 of the 1952 report. Work on cosmic ray research on p. 11–12 of the 1953 report, and on p. 17–18 of the 1954 report. In the 1955 report, work on air pollution studies in wind tunnels under Dr. G. H. Strom is described on p. 14–15, on solar energy utilization (Dr. Maria Telkes) on p. 16–17, in atmospheric physics (Dr. B. Haurwitz) on p. 33–35, on applied meteorology (Dr. Jerome Spar) on p. 35 and on oceanography and its relation to weather (Dr. Gerhard Neumann) on p. 36. Cosmic ray flights are mentioned in section on atomic physics on p. 30–31 (Dr. Serge Korff). *Subject Headings:* **1. Meteorological research 2. Annual meteorological reports 3. New York Univ.**—*M.R.*

9.1–66 551.5:061.2(7)

Spengler, Kenneth C., **Report of the executive secretary 1955.** *Weatherwise*, Boston, 9(1):26–28, 34, Feb. **1956.** **DWB**—General service, National Register of Scientific and Technical Personnel, guidance literature for various publications and activities, service to employers and members, cooperation with other organizations and local branches (34), reports of com-

mittees, inquiries (500 a month), changes of address of members (3000 a year), Professional Directory, forthcoming publications, Meteorological Abstracts, Glossary, translation projects, etc. are among activities of the Office of Executive Secretary of the A.M.S. mentioned in this article. *Subject Heading:* **1. American Meteorological Society activities.**—*M.R.*

9.1–67 551.5:061.1(410)

Sutton, Sir Graham, **Reorganization of the Meteorological Office.** *Meteorological Magazine*, London, 86(1022):225–230, Aug. **1957. DWB**—In 1955 a Committee under LORD BRABAZON reviewed the organization of the British Meteorological Office. The Director-General here reviews the Committee's report. The new Headquarters organization is shown in a diagram. Under the Director-General are 3 divisions, Director of Services, Secretary, and Director of Research, responsible for 17 Branches. Some of these are new, including MO8 "Techniques and Training." Facilities for research are improved. HQ will be at Bracknell. The Meteorological Committee has been reduced to 5. *Subject Heading:* **1. British Meteorological Office.**—*C.E.P.B.*

CONFERENCES AND SYMPOSIA

See: **Water for industry: a symposium** (A.A.A.S.), 9.1–1; **Atmospheric elec. conf.**, 9.1–3; **Tropical cyclone symposium**, 9.1–4; **Radio propagation symposium** (Wait), 9.1–5; **Oceanog. symposia** (Stommel), 9.1–80; **Cloud physics conferences** (Mason), 9.1–244.

EDUCATION, HISTORY AND BIOGRAPHY

BIOGRAPHY

9.1–68 551.5:92

Flohn, Hermann, [**Obituary of**] **Vilhelm Bjerknes.** Reprint from **Forscher und Wissenschaftler im heutigen Europa—Weltall und Erde,** Printed Oldenburg/Oldb, **1956**(?), p. 303–310. 2 refs.—The development of synoptic and dynamic meteorology during the lifetime of V. BJERKNES is traced in detail, in addition to the actual contributions (and impulse given to his colleagues) by the father of the "Norwegian School" of frontal meteorology. His work in a wide range of geophysical and astrophysical problems is also mentioned. He made major contributions to oceanography and theoretical hydrodynamics. He was born March 14, 1862 and died on April 10, 1951 at the age of 89. *Subject Headings:* **1. Biography of V. Bjerknes 2. History of synoptic meteorology 3. Bjerknes, V.**—*M.R.*

9.1–69 551.594:92

Dorfman, Ia. G., **Veniamin Franklin—vydaiushchiĭsia fizik XVIII veka (k 250-letiiu so dnia rozhdeniia).** [B. Franklin, outstanding physicist of the 18th century: in commemoration of his 250 birthday.] *Priroda*, Moscow, 45(2):72–81, Feb. **1956.** figs., port., refs. **DLC**—Events in FRANKLIN's life and some of his electrical experiments are reviewed objectively and illustrated, and his electrical theories quoted. His work on the lightning rod is also covered and compared with work of Russian scientists of the same period. *Subject Headings:* **1. Franklin's electrical experiments 2. Biography of B. Franklin 3. Franklin, B.**—*M.R.*

9.1–70 551.5:92

Gold, E., **Obituary** [**of**] **R. G. K. Lempfert, C.B.E., M.A., F.R.Met.S.** *Meteorological Magazine*, London, 86(1023):280–282, Sept. **1957. DWB**—Born Oct. 7, 1875, educated Manchester Grammar School and Cambridge. Joined Meteorological Office 1902, and was responsible for many official publications and relations with Royal Met. Soc. (President, 1930–32). Wrote (with SHAW) **Life history of surface air currents,** also papers on line squalls; first use of "front" in 1910. Retired Dec. 31, 1938. Died June 24, 1957. *Subject Headings:* **1. Obituaries 2. Lempfert, R. G. K.**—*C.E.P.B.*

9.1–71 551.5:92

[**Obituary notice on**] **Willis Isbister Milham.** *American Meteorological Society, Bulletin*, 38(5):301, May **1957.** photo. **DWB, DLC**—WILLIS I. MILHAM, Professor Emeritus of

Williams College, Mass., and past President of A.M.S., died March 23, 1957 at 83. Retired after 40 years as Professor of Astronomy in 1942—taught 47 years at Williams College. Director of observatory there. Wrote classic textbook on meteorology in 1912—adopted by every U. S. college and university offering meteorology. Born at Kinderhook, N. Y. Graduated from Williams College in 1894, attended University of Strassburg and obtained Doctorate there. *Subject Headings:* **1. Biography of W. I. Milham 2. Obituary of W. I. Milham 3. Milham, W. I.**—*M.R.*

9.1–72 551.5:92

McKie, Douglas, **René-Antoine Ferchault de Réaumur (1683–1757), the Pliny of the eighteenth Century.** *Science Progress*, London, 45(180):619–627, Oct. **1957.** 12 figs., photo. **DWB**—Born in La Rochelle Feb. 28, 1683, died Oct. 18, 1757. Wrote on mathematics and extensively on natural history and metallurgy. In 1730 constructed his thermometer and organized world-wide observations of temperature. *Subject Headings:* **1. Biography 2. Réaumur, René-Antoine Ferchault de.**—*C.E.P.B.*

9.1–73 551.5:92

Chapman, Sydney, [**Obituary of**] **Prof. Carl Störmer, For. Mem. R. S.** *Nature*, London, 180(4587):633–634, Sept. 28, **1957. DWB**—Fredrik Carl Mülertz Störmer, born Sept. 3, 1874 at Skien, Norway, died Aug. 13, 1957. In 1903 as Professor of pure mathematics at Oslo began study of motion of a charged particle in the field of a magnetic dipole, and continued till 1950. In 1909 began to apply results to auroral observations. He made valuable contributions to sunlit auroras, auroral spectroscopy and other subjects. In 1955 published **The Polar Aurora.** *Subject Headings:* **1. Obituaries 2. Störmer, F. C. M.**—*C.E.P.B.*

9.1–74 551.5:92 550.3:92

Banerji, S. K., **Professor Saha's contributions and activities relating to geophysics.** *Science and Culture*, Calcutta, 22(4):215–221, Oct. **1956.** Also: Basu, D., **The physics of the sun.** *Ibid.*, 22(4):198–201, Oct. **1956.** eqs. Also: Sen, S. N., **In memorian: Meghnad Saha.** *Ibid.*, 21(9):481–491, March **1956.** photo. Also: Das, A. K., **Prof. Meghnad Saha, 1893–1956.** *Indina Journal of Met. and Geophysics*, 7(2):97–102, April **1956.** photo. **DLC**—Saha's contributions include hydrological developments and studies, formation of the Atmospheric Research Committee in 1941–42, organization of a "Weather Prediction" symposium in 1938, ionospheric, magnetic and astrophysical work since the war and a great deal of geophysical research and development. Article by D. Basu gives details of Saha's astrophysical work on radiations from sun and stars. The third article emphasizes Saha's work in ionospheric physics. *Subject Headings:* **1. Geophysical research 2. Saha, Meghnad 3. Weather forecasting.**—*M.R.*

HISTORY

See: **Early obs. of free atmosphere** (Loewe), 9.1–123.

BIBLIOGRAPHY AND TERMINOLOGY

See also: **Condensation nuclei** (Grabovskiĭ), 9.1–8; **Quaternary glaciation** (Charlesworth), 9.1–12; **High altitude weather affecting background radiation** (Martin), 9.1–24; **Rime definitions** (Grunow), 9.1–240.

9.1–75 551.510.42:016

†**The Air Pollution Bibliography,** Vol. 1, pub. Wash., D. C., July **1957.** irregular? Vol. 1, 750 items. Arranged alphabetically by author (or the first word in case of anonymous articles.) Subject index, Geographical index and Personal author index. **DLC**—The first volume consists of a compilation of 750 photographically reproduced card-form abstracts of material on the administrative, economic, engineering, legal, medical, physical, chemical and meteorological aspects of air pollution or control of air pollution. Most of the material has been published since 1952, and is in several languages. The material is arranged alphabetically by author (or title if anonymous), and chronologically for any given author. Abstracts are of the informative type. A subject, geographical and place index is appended. *Subject*

Headings: **1. Atmospheric pollution bibliographies. I. Gibson, Jack R.** (*ed.*) **II. Culver, Wave E.** (*ed.*) **III. Kurz, Mary E.** (*ed.*) **IV. U. S. Library of Congress. Technical Information Division.**—*M.R.*

9.1–76 551.510.42:016

†Cincinnati. Univ. Kettering Laboratory, **Annotated bibliography (on) the effects of atmospheric pollution on the health of man.** Cincinnati, **1957.** 481 p. 790 items.—The columinous compilation of informative abstracts is divided into five main categories: 1) community studies (of fog disasters, city-wide surveys, epidemiological surveys, statistical studies etc.); 2) studies of pollution itself, reviews and bibliographies, etc.; 3) effects on humans; 4) on animals; and 5) tests of cardiovascular and pulmonary functions in the laboratory or field. Seventy-five pages are devoted to subject, geographic and author indexes. Some of the abstracts are 2 or 3 page summaries of the content of the article. *Subject Headings:* **1. Atmospheric pollution bibliographies 2. Atmospheric pollution and health 3. Annotated bibliographies.**—*M.R.*

9.1–77 551.582(4):016

†Edelman, Cornelius Hendrik and Eeuwens, B. E. P. (*both, Wageningen, Netherlands*), **Bibliography on land water utilization and conservation in Europe.** *Food and Agricultural Organization of the United Nations, Rome, FAO/55/11/7708,* **1955.** 347 p. Arranged by subject groups, with countries alphabetically within the groups. **DWB** (016.91 Ed21bi)—The 3–4 thousand references cited in this bibliography are arranged under 7 major heads: 1) General and Agricultural geography—maps; 2) Climate; 3) Soils; 4) Vegetation; 5) Hydrology and hydrography; 6) Land reclamation; 7) Soil conservation and erosion. Under **Climate** (p. 76–127) there are over 500 references to articles in all languages on general climatology and meteorology, agrometeorology, and on climate and meteorology of Norway, Sweden, Finland, Denmark, Great Britain, Ireland, Netherlands, Belgium, Luxemburg, Germany, France, Switzerland, Austria, Portugal, Spain, Italy, Yugoslavia, Greece, Turkey, and Cyprus. Other sections are analyzed similarly by country. Numerous articles on precipitation, evaporation, runoff, soil moisture and ground water are found in the section on **Hydrology.** Bibliographies, yearbooks and serial publications are cited in addition to articles and monographs. *Subject Heading:* **1. Bibliography on climatology of Europe.**—*M.R.*

9.1–78 551.57:001

Giacomelli, Raffaele, **Terminologia di idrometeore: nevischio nebbia, foschia, caligine, galaverna, calabrosa, vetrone, gragnola e neve tonda.** [Terminology of hydrometeors: snow grains, fog, damp haze, dry haze, soft rime, hard rime, glaze, small hail and snow pellets.] *Rivista di Meteorologia Aeronautica,* Rome, 16(2):21–36, April/June **1956.** French, English and German summaries p. 21. **DLC**—Nine Italian terms denoting various hydrometeors are analyzed *in extenso* as to their origin, history and conflicting meanings in colloquial and scientific usage. Equivalents in English, French and German are considered. Definitions of BERGERON's polyglot dictionary (1939) are given. *Subject Headings:* **1. Hydrometeor terminology 2. Definitions.**—*G.T.*

APPLIED METEOROLOGY

MARINE METEOROLOGY AND OCEANOGRAPHY

See also: **World ocean** (Murontsev), 9.1–15; **Fog in the German Bight** (Bintig, Markgraf), 9.1–18; **Sailing directions for northern U.S.S.R.** (U. S. Hydrographic Off.), 9.1–57; **Equivalent velocities for Beaufort estimates** (Verploegh), 9.1–120; **Dust deposition, Caspian Sea** (Bruevich, Gudkov), 9.1–163.

9.1–79 551.46

†Sverdrup, H. U., **Oceanography.** *Handbuch der Physik,* Berlin, 48:608–670, **1957.** 26 figs., 6 tables, numerous foot-refs., 43 eqs., bibliog. p. 607 (4 refs.). **DWB** (551.03 N236)—The basic knowledge of the physical and chemical properties and characteristics of the oceans (except waves and tides) is reviewed in a quantitative as well as descriptive manner. In-

struments and methods of observation, the character of the ocean basins, chemical composition of ocean water, thermal properties, density, viscosity, conductivity, etc., the boundary layer between the sea and the air, evaporation, heat budget, transport of heat by oceans, salinity distribution, water masses, hydrodynamics theory applied to wind currents, water level, internal waves, currents in general, deep water currents, etc. are treated in successive chapters. *Subject Headings:* **1. Oceanography 2. Physical oceanography.**—*M.R.*

9.1–80 551.465:061.3

Stommel, H., **The abyssal circulation of the ocean.** *Nature*, London, 180(4589):733–734, Oct. 12, **1957. DWB**—Account of a symposium at I.U.G.G., Toronto, Sept. 5–6, 1957. So little is known about the nature of the deep circulation that entirely different points of view could be maintained. Charts of temperature, salinity and dissolved oxygen at 4000 m, and in Pacific at 5000 m, were presented. General flow of water below 2000 m is from limited areas in northern N. Atlantic and shallow shelf areas surrounding Antarctica into Indian and Pacific Oceans. The upward flow is widespread, the average interval between introduction into cold layer and upwelling through 2000 m level being 400–1200 years. *Subject Headings:* **1. Oceanic deep circulation 2. Symposia.**—*C.E.P.B.*

9.1–81 551.556.8:532.593:551.46 525.6

†Defant, A., **Flutwellen und Gezeiten des Wassers.** [Tidal waves and tides in the seas.] *Handbuch der Physik*, Berlin, 48:846–927, **1957.** 27 figs., 7 tables, numerous refs., 19 eqs. **DWB** (551.03 N236)—The theory of standing and progressive waves in channels, reflection, earth's rotation effects, internal waves, boundary waves, cellular motions, closed bodies of water (lakes and bays), meteorological effects (p. 877–879), theory of tides, tides in enclosed basins, effect of uneven bottom, tides and tidal currents near shore and in open ocean, influence on boundary seas, influence of friction and rotation of earth tides in ocean, coupled with those in solid earth, and energy considerations are treated quantitatively with many illustrations. *Subject Headings:* **1. Ocean wave theory 2. Tidal theory 3. Wind waves.**—*M.R.*

9.1–82 532.59:551.46

†Roll, Hans-Ulrich, **Oberflächen-Wellen des Meeres.** [Surface waves in the ocean.] *Handbuch der Physik*, Berlin, 48:671–733, **1957.** 33 figs., 3 tables, numerous foot-refs., 28 eqs., bibliog. p. 732–733 (17 refs.). **DWB** (551.03 N236)—A concise review article summarizing theoretical and empirical knowledge of ocean waves—classical wave theory, group velocities, structure of sea waves, wave observation, characteristics of wind waves and swell, spectral analysis of wave records, statistical theory of sea height, etc., energy spectrum of wind waves, origin and growth of waves, observation, propagation, decay, effect of turbulence and tides, breakers and surf, refraction by coasts, etc. Useful nomograms and schematic diagrams, curves, etc. are included. *Subject Heading:* **1. Ocean waves.**—*M.R.*

9.1–83 551.463:535.37

Tarasov, N. I., **Zhivoĭ svet moria.** [Bioluminescence of the sea.] Moscow, Izd-vo Akademii Nauk SSSR, **1956.** 124 p. 49 figs. (incl. photos), 12 refs. (*Akademiia Nauk SSSR. Nauchno Populiarnaia Seriia.*) **DLC** (GC181.T32)—An instructive monograph discussing: 1) general knowledge of marine phosphorescence and optical effects thereof, 2) how it is observed, 3) organisms associated with marine phosphorescence, 4) occurrence in various parts of the oceans, and 5) practical value of knowledge of bioluminescence (military or naval significance, etc.). *Subject Headings:* **1. Marine phosphorescence 2. Bioluminescence 3. Oceanography.**—*M.R.*

9.1–84 535.4:551.463

Schenck, Hilbert, Jr. (*Clarkson College of Technology, Potsdam, New York*), **On the focusing of sunlight by ocean waves.** *Optical Society of America, Journal*, 47(7):653–657, July **1957.** 7 figs., 4 foot-refs., 14 eqs. **DWB, DLC**—A common optical phenomenon observed in shallow water is the presence of bright lines or bands of light moving across the sea bottom at surface-wave velocity. It is shown that these regions of increased intensity are mainly produced by the refraction of sunlight at the wavy surface. The depth at which intensity peaks reach a maximum is shown to be a function of the wave shape, trochoidal or sinusoidal, and the wave

dimensions. This depth increases as the wave becomes longer and flatter. Intensity peaks of up to six times the average intensity level are predicted to be theoretically possible. *Subject Heading:* **1. Light refraction in sea.**—*Author's abstract.*

9.1–85 551.524:551.526.6:551.573

Strokina, L. A., **Turbulentnyĭ teploobmen s atmosferoĭ i isparenie s poverkhnosti Baltiĭskogo moria.** [Turbulent heat exchange with the atmosphere and evaporation from the surface of the Baltic Sea.] *Meteorologiia i Gidrologiia*, No. 5:56–60, May **1956.** 5 figs., 2 tables, 10 refs., 4 eqs. **DWB, DLC**—The formulas for determining heat loss by evaporation (SHULEĬKIN) and for calculating the turbulent heat exchange of the sea surface and the atmosphere are presented. The results of computations of the annual totals of turbulent heat exchange between water and air and annual total of heat loss by evaporation in the Baltic Sea are presented in graphs and in tables. It was found that during warming the radiation balance was the most important constituent of the thermal balance and the heat exchange with the deeper layers. During the period of cooling the principal role is played by the transport of heat. The annual variations of the various constituents of heat exchange are similar in the sea and in its gulfs. Geographical variations of heat exchange water-air and of evaporation are slight during the warm season and more marked during the colder season. *Subject Headings:* **1. Turbulent heat exchange 2. Heat exchange sea-atmosphere 3. Evaporation from seas 4. Baltic Sea.**—*I.L.D.*

9.1–86 551.526.6:551.464

*Baranov, I. V. and Shpaĭkher, A. O., **K voprosu ob izmeneniĭ nekotorykh elementov gidrologicheskogo rezhima Baltiĭskogo moria.** [Variations in some elements of the hydrological regime of the Baltic Sea.] *Vsesoiuznoe Geograficheskoe Obshchestvo, Leningrad, Izvestiia*, 88(3):239–250, May/June **1956.** 3 figs., 11 tables, 16 refs. **DLC**—On the basis of their own observations and already published material, the authors examine the apparent rise in water temperature and salinity of the eastern part of the Baltic Sea and the causes of the rise in salinity. Considerable data are presented on the mean water temperature at different horizons during the period 1921–1940 and 1911–1930, the limits of variation of Cl content during 1921–1923 and 1935–1937, mean variation of temperature and salinity at various depths for the periods 1921–1930, 1921–1935, 1925–1940, 1925–1945 and 1921–1950, time of beginning of increase in salinity at different localities in the Baltic Sea, etc. *Subject Headings:* **1. Sea temperature variations 2. Salinity 3. Baltic Sea.**—*I.L.D.*

9.1–87 551.506.1:627.92(261.2,261.3)

*Hamburg. Seewetteramt, **Meteorologische Beobachtungen von deutschen Feuerschiffen der Nord- und Ostsee (Bundesrepublik), 1953.** [Meteorological observations of German light ships in the North and Baltic seas of the Federal Republic, 1953.] Its *Einzelveröffentlichungen*, No. 13, **1957.** 101 p. mostly tables. **DWB**—Extensive data tabulation for 1953 for 7 German lightships in the North Sea and 3 in the Baltic. Regular (4 times daily) observations for 3 of the lightships and mean monthly and annual values and frequencies of temp., wind, cloudiness, humidity, precip. days and amount, pressure and air-water temp. differences are included. *Subject Headings:* **1. Lightship observations 2. German lightships 3. Yearbooks 4. North Sea 5. Baltic.**—*M.R.*

GLACIOLOGY AND ICE

See also: **Quaternary glaciation** (Charlesworth), 9.1–12; **Polar ice** (Armstrong), 9.1–56; **Pleistocene glaciation, Australia** (Browne), 9.1–272; **Australian 'arid period'** (Gill), 9.1–273; **Late glacial cwm glaciers, Wales** (Seddon), 9.1–274.

9.1–88 551.311.182(282.27)

Brown, R. J. E., **Observations on break-up in the Mackenzie River and its delta in 1954.** *Journal of Glaciology*, 3(22):133–140, Oct. **1957.** 10 figs., table, 3 refs. English and French summaries p. 133. **DWB**—Mackenzie River of Canada extends through 16° lat. Climatic

conditions are described. At end of winter ice in delta is more than 1 m thick and overlain by snow. Break-up begins at source and progresses downstream. Ice near mouth causes severe jams and floods. Break-up in 1954 chronicled day by day May 19–June 9; it was an abnormally late year. *Subject Headings:* **1. River ice break-up 2. Mackenzie River, Canada.** —*C.E.P.B.*

9.1–89 551.311.12(798)

Miller, Don J., **The surface velocity of the Yakataga Glacier, Alaska.** *Journal of Glaciology*, 3(22):125–130, Oct. **1957.** 6 figs., 2 refs. English and German summaries p. 125. **DWB**—Climatological observations at Yakataga and Yakutat are summarized. Movement of glacier 1938–54 averaged 114 m/yr. *Subject Headings:* **1. Glacier movement 2. Alaska.** —*C.E.P.B.*

9.1–90 551.583.2:551.311.12:551.21(798)

Muller, Ernest H. and Coulter, Henry W., **The Knife Creek glaciers of Katmai National Monument, Alaska.** *Journal of Glaciology*, 3(22):116–122, Oct. **1957.** 5 figs., table, 7 refs. English and German summaries p. 116. **DWB**—Exploration of Fourth glacier of western Alaska after 1912 eruption of Katmai showed that terminus has been essentially stationary over past 40 yrs, ablation losses being reduced to a minimum by a thick layer of pumice and ash. Thinning of upper reaches is due to destruction of part of accumulation area and perhaps climate amelioration. *Subject Headings:* **1. Glacier variations 2. Volcanic eruptions 3. Alaska.**—*C.E.P.B.*

ASTRONAUTICS—SATELLITE OBSERVATORIES

See also: **Space research and exploration** (Bates, Moore), 9.1–2; **Aeronautical met. textbooks** (Regula), 9.1–9; **Rockets in ionosphere research** (Burgess), 9.1–10.

9.1–91 551.510.535:551.594.13:551.507.362

Berning, Warren W. (*Ballistic Research Labs., Aberdeen Proving Ground, Md.*), **Ionospheric structure as determined by a minimal artificial satellite.** (In: Van Allen, James A. (*ed.*), **Scientific uses of earth satellites.** Ann Arbor, Univ. of Michigan Press, **1956.** p. 253–262. 3 figs., ref., 13 eqs.) **DWB**—A minimal artificial satellite is here defined as one of such small size that internal equipment can consist of no more than a small beacon used in the electronic tracking of the satellite. On the assumption that the beacon transmits a continuous wave, errors will be incurred in the tracking system data whose magnitudes depend on the electron density in the ionosphere and on the frequency of transmission. The material contained herein briefly discusses the problems and develops the analytical methods necessary for determining ionospheric electron densities from trajectory measurements. It is shown that a fairly detailed knowledge of the orbit permits determination of equivalent electron density at the satellite as well as total electron content below the satellite altitude. A small ambiguity in the data may be largely removed by geometrical considerations or eliminated by the suitable placement of additional ground receivers. *Subject Headings:* **1. Satellite observatories 2. Ionospheric structure 3. Ionospheric electron density.**—*Author's abstract.*

9.1–92 551.507.36:629.19

deBey, L. G. (*Ballistic Research Labs., Aberdeen Proving Ground, Md.*), **Systems design considerations for satellite instrumentation.** (In: Van Allen, James A. (*ed.*), **Scientific uses of earth satellites.** Ann Arbor, Univ. of Michigan Press, **1956.** p. 49–54. ref.) **DWB**—The military services have proposed a number of satellite programs. Each has objectives tailored to the interests of the sponsoring agency. The magnitude of any satellite program warrants careful consideration of the program output in terms of the number of scientifically useful data obtained. To achieve maximum output, compatible with the missile-system limitations, in turn requires a careful choice of observing methods. The types of observations required for different programs are discussed, as are factors affecting choice of observing

systems, their locations and technical specifications. The importance of adhering to the philosophy of redundancy in observing methods is stressed. An array of instrumentation systems is proposed as being the minimum that could be expected to yield successful results in the first satellite firings. *Subject Headings:* **1. Satellite programs 2. Satellite instrumentation.**—*Author's abstract.*

9.1–93 551.507.362:551.510.535:551.594.7:629.19

Hartman, L. M. and Haviland, R. P. (*both, Gen. Elec. Co.*), **A satellite propagation experiment.** (In: Van Allen, James A. (*ed.*), **Scientific uses of earth satellites.** Ann Arbor, Univ. of Michigan Press, **1956.** p. 268–275. table.) **DWB**—A satellite ionosphere and propagation experiment is proposed. Satellite equipment consists of a low-power c-w transmitter operating on a frequency near the ionosphere cut-off frequency corresponding to maximum geometric line-of-sight distances from the satellite. Statistical data on coverage are sought by enlisting aid of operators in the Radio Amateur Service. Particular measurements to be made at specially equipped stations are reviewed. *Subject Headings:* **1. Ionospheric satellite experiment 2. Ionospheric radio wave propagation.**—*Author's abstract.*

9.1–94 629.19:551.507.362

Haviland, R. P. (*Special Defense Projects Dept., General Electric, Philadelphia*), **What the future holds for the earth satellite.** *General Electric Review*, Schenectady, N. Y., 59(5):10–16, Sept. **1956.** 10 figs., 2 tables. **DLC**—The possible orbits and respective areas of the earth which could be seen from a satellite at 300 mi, 4000 mi; or the areas over which a satellite at 22,300 mi height could relay radio or TV signals from hemisphere to hemisphere or within the Western Hemisphere are shown on maps. Tables give distances of vision, field of view, etc. for heights of 257, 620, 1210, 2222, 4000, 7650, 19,000 and 22,300 mi. Weather charting and forecasting possibilities are also considered. Hurricanes, clouds, albedo and solar radiation could be measured or observed from such a station. *Subject Headings:* **1. Satellite orbits 2. Satellite observatories.**—*M.R.*

9.1–95 551.510.535:551.594.13:629.19 551.510.535:551.524.7:629.49

Hok, Gunnar; Sicinski, H. S. and Spencer, N. W. (*all, Dept. of Elec. Engr., Univ. of Michigan*), **Temperature and electron-density measurements in the ionosphere by a Langmuir probe.** (In: Van Allen, James A. (*ed.*), **Scientific uses of earth satellites.** Ann Arbor, Univ. of Michigan Press, **1956.** p. 263–267. fig., 4 refs.) **DWB**—Langmuir probe techniques offer interesting possibilities for obtaining important data by measurements from an ionospheric satellite. The feasibility of such measurements has been demonstrated in a preliminary manner on rockets in the lower E-layer of the ionosphere. The most straightforward data calculated from probe records are for temperature. Approximate thermal equilibrium is assumed in each stratum of the ionosphere. During part of each voltage sweep predominantly electrons are collected; this electron current yields both temperature and electron density. The collection of positive ions appears difficult to translate into useful information. *Subject Headings:* **1. Satellite observatories 2. Satellite ionospheric electron density measurements 3. Satellite ionospheric temperature measurements 4. Langmuir probe technique.**—*Authors' abstract.*

9.1–96 551.507.362:550.38

Katz, Ludwig (*Ionospheric Phy. Lab., Geophy. Res. Dir., Air Force Cambridge Res. Center*), **Geomagnetic information potentially available from a satellite.** (In: Van Allen, James A. (*ed.*), **Scientific uses of earth satellites.** Ann Arbor, Univ. of Michigan Press, **1956.** p. 247–252. 2 figs., 2 refs., eqs.) **DWB**—Describes measurements which can be made in and above ionosphere to determine the origin and structure of the earth's magnetic field and the ring currents which are thought to be responsible for this field. Vertical distribution of magnetic field up to 110 km computed by harmonic analysis, etc., and observed from aerobee, is shown on a chart. *Subject Headings:* **1. Satellite geomagnetic observation 2. Geomagnetic field intensity gradient.**—*M.R.*

AERONAUTICAL METEOROLOGY

See also: **Airways meteorological observations** (Kolobkov), 9.1–37; **Altimeters for aircraft** (Brit. Standards Inst.), 9.1–135; **Aircraft response to atmos. disturbances** (Diederich), 9.1–222; **Aerodynamics** (Eggleston, Diederich), 9.1–224; **Exhaust condensation trails** (Gt. Brit. Naval Weather Service), 9.1–250.

9.1–97 551.5:629.13(02)

Shtal', V. A., **Meteorologiia v aviatsii.** [Meteorology in aviation.] Leningrad, Gidrometeorologicheskoe Izd-vo, **1956.** 83 p. 20 figs., tables. (*Nauchno-Populiarnaia Biblioteka.*) **DLC** (TL556.S52)—All of the usual elements of weather that affect aviation: pressure, density, temperature, wind, precipitation, icing, visibility, thunderstorms, clouds, turbulence, plus the elements affecting construction of airports and ground operations are first discussed; followed by a section on the meteorological service to aviation of maps, codes, forecasts, collection and transmission of reports, observations at airports, in mountains and at extreme altitudes, and a final section on flight plans and advisories, reports from aircraft and navigation with the aid of weather reports. A number of schematic diagrams are included. A sample aviation report (Leningrad-Moscow) is included. *Subject Headings:* **1. Aeronautical meteorology textbooks 2. Flight planning 3. U.S.S.R.**—*M.R.*

9.1–98 551.524.7:629.13

McNaughton, I. I., **Proposed maximum and minimum atmospheric temperatures for aircraft design purposes.** *Farnborough. Royal Aircraft Establishment, Departmental Memo.*, No. ME128, **1957.** 13 p. 7 figs., 8 tables, ref. Mimeo.—Threshold maximum and minimum temperatures for frequencies of once in 10 years and 1, 5 and 10 times a year were computed from 0–100,000 ft for 0, 20, 30, 50 and 70°N. Proposals are made for atmospheric temperatures for aircraft design purposes. *Subject Headings:* **1. Upper air temperatures 2. Aircraft design temperatures.**—*C.E.P.B.*

9.1–99 551.558.1:797.55

Welch, Ann Courtenay; Welch, Lorne and Irving, F. G., **The soaring pilot.** London, John Murray, **1955.** 227 p. 39 figs. **DLC**(TL765.W4). Review by P. G. Satow in *Institute of Navigation, London, Journal,* 10(1):112–113, Jan. **1957.**—A great deal of practical information on thermals, orographic currents, clouds and other meteorological factors affecting gliding or soaring is contained in this book for popular use. Construction of gliders, instruments, test flying, cross country and championship flying, flying in clouds, landing in fields, navigation, history of soaring (since 1920), etc. are also covered. A number of schematic diagrams illustrate gliding techniques in thermals, cloud streets, over hills and in waves or mountains. *Subject Headings:* **1. Gliding flights 2. Thermals.**—*M.R.*

9.1–100 551.574.7

§*Rohan, P. K. and Ohaonghusa, F., **Aircraft icing over the Eastern North Atlantic.** *Eire. Meteorological Service, Technical Note,* No. 21, Oct. **1956.** 14 p. 5 figs., 6 tables, 8 refs. **DWB**—An analysis of 37,746 aircraft reports in the Shannon-Prestwick flight information area (43°–61°N, 8°–30°W) and at altitudes from 2000 ft to 25,000 ft during 12 months from Oct. 1953 through Sept. 1954 shows the variation of icing conditions with area, latitude, height, season, temperature, air mass or frontal type, severity, type of aircraft, turbulence, airspeed, etc. In all, 582 reports of ice were obtained (1.54% of cases), representing a possible minimum frequency of icing, since airplanes flying over the ocean have the latitude, time and altitude flexibility to enable them to keep out of icing areas once they are reported or predicted. Higher frequencies over the U. S. and Canada reflect the more restricted flying patterns, schedules and altitude ranges of continental aircraft. Histograms show frequency of icing in various temperature ranges for summer and winter. Synoptic surface and 500 mb charts for Sept. 23, 1954 show location of reports of icing with respect to fronts and air flow on this, the worst icing day of the year. Icing frequency increases with latitude from summer to winter and decreases with altitude. *Subject Headings:* **1. Icing of aircraft frequencies 2. Eastern North Atlantic.**—*M.R.*

9.1–101 551.506.7:551.507.352:551.551.5

Walker, Walter G. (*Langley Aeronautical Lab., Langley Field, Va.*), **Gust-load and air-speed data from one type of two-engine airplane on six civil airline routes from 1947 to 1955.** *U. S. National Advisory Committee for Aeronautics, Technical Note*, 3621, Feb. **1956.** 26 p. 7 figs., 4 tables, 11 refs., 3 eqs. **DWB, DLC**—V-G data covering 70,000 hours were obtained from six different operations of a two-engine civil transport airplane and are analyzed to determine the severity and frequency of occurrence of the air-speeds, gust loads, and gusts. The results show sizable variations in the gusts, gust loads, and operating speeds among the present operations but, in general, these results are similar to those from past operations of the same type of airplane. *Subject Headings:* **1. Airplane observations 2. Gustiness measurements.**—*NACA abstract.*

9.1–102 551.508.24:551.501.7

Van Der Maas, Christian J. (*Glenn L. Martin Co.*), **Elevated temperature requirements for a new air-borne flight analyzer.** *Aeronautical Engineering Review*, N. Y., 16(3):37–41, March **1957.** 2 figs., 2 tables, 8 refs. **DLC**—Ambient temp. distributions, not standard atmosphere temp. values, are needed for design of high speed aircraft. Before this can be done records must be made during flight of stagnation temp., Mach No., true air speed and pressure and from these values the ambient temp. can be derived. Whereas the ambient temp. varies from 20° to 80°F around the "standard" values, the boundary layer temp. can vary as much as ±50° to ±100°F with high frequency. Values of temp. to 100,000 ft from various flights and sources are compared with standard atmosphere on a graph and scatter diagram. Design problems in respect to these factors are discussed at some length. *Subject Headings:* **1. Air-borne temperature recorders 2. Standard atmospheric temperature.**—*M.R.*

AGRICULTURAL METEOROLOGY

See also: **Arctic agriculture** (Korol), 9.1–59; **Temp. effects on plants** (Schwemmle), 9.1–213; **Degree-days and cereal growth** (Nuttonson), 9.1–278.

9.1–103 551.586:633.491

Schrödter, Harald, **Phänometrisch-statistische Untersuchungen zum Problem "Witterung und Pflanzenwachstum."** [Phenometric-statistical investigations into the problem of weather and plant growth.] *Annalen der Meteorologie*, 8(1/2):1–6, **1957.** 6 figs., 6 refs. **DWB**—Phenometry is defined as measurement of plant growth and influence of weather on it. Author discusses growth of knobs on potatoes (5–31 July) and mean and relative growth of flax over 50 days. For "Capella" potatoes partial correlation and regression coefficients are plotted between daily growth and temperature, soil moisture and sunshine duration. It is clear that growth of knobs is the total effect of all 3 weather variables. *Subject Headings:* **1. Bioclimatology 2. Potatoes.**—*C.E.P.B.*

9.1–104 551.586:616.24:636.4

Bellán, Gyula, **A sertések ún. tüdövizenyöjének meteorológiai vonatkozásai.** [Meteorological connections of edema of the lungs in hogs.] *Időjárás*, Budapest, 60(4):241–247, July/Aug. **1956.** 2 figs., 6 refs. Russian and German summaries p. 241. **DLC**—Epidemic spreading of edema of the lungs in hogs at Szentes, Hungary from Aug. 1953 to Jan. 1954 is compared with meteorological data, namely temperature and precipitation at Szentes and atmospheric circulation and fronts at Budapest. As a result of the study the author believes that meteorological factors are instrumental in the development of the disease (whose nature is hitherto unknown) and hopes that this discovery may help to find the right approach to a cure. According to an editor's note the material presented, although of definite interest, does not justify far-reaching conclusions. *Subject Headings:* **1. Biometeorology 2. Lung diseases 3. Pigs.**—*G.T.*

9.1–105 551.586:633.11(439.1)

Berényi, Dénes, **A búza "kombájnérettsége" és az időjárás.** [The "combine ripeness" of wheat and the weather.] *Időjárás*, Budapest, 60(4):250–252, July/Aug. **1956.** 6 figs.

DLC—Ripeness of wheat for mechanized harvesting may be determined from the water content of the grains. Data on grain water content at Herceghalom and temperature, sunshine duration and precipitation at nearby Budapest (25 km) are graphically presented for June 25–July 11, 1953; June 28–July 14, 1954 and July 1–17, 1955. A definite relationship appears to exist between weather elements and ripeness of grain. It is suggested that harvesting time could be predicted with the help of extended or long-range weather forecasts. Comparative atmospheric humidity and temperature data are also presented for a wheat field and an open field. *Subject Headings:* **1. Weather effects 2. Wheat harvest 3. Hungary.**—*G.T.*

9.1–106 632.111.3

Morgen, A., **Zur künstlichen Wärmesteuerung im Wurzelraum der Pflanzen.** [Artificial warming in root space of plants.] *Meteorologische Rundschau*, 10(4):135–139, July/Aug. **1957.** 6 figs., table, 11 refs. **DWB**—Temperature minima 5 cm below and immediately above thin turf and bare soil are different. Warming the air is difficult, warming root space offers greater possibilities. Experiments in cooling and heating are described. In a frost only the ground immediately above the hot point was above 0°C; at 50 cm above ground plants suffered frost damage. *Subject Heading:* **1. Soil heating.**—*C.E.P.B.*

FOREST METEOROLOGY

See also: **Tree rings as indicators of growth due to weather** (Koch), 9.1–277.

9.1–107 551.577:551.588.6

†*Paszýnski, Janusz, **Opady atmosferyczne dorzecza odry i ich związek z hipsometrią i zalesieniem.** [Precipitation in the Oder Basin and its relation to altitude and forest cover.] *Polska Akademia Nauk. Instytut Geografii, Prace Geograficzne*, No. 4, **1955.** 90 p. 26 figs., 10 tables, 57 refs. Russian and German summaries p. 85–90. **DWB**—A sizable monograph giving extensive data on the precip. for 1891–1930 in the Oder Basin, using detailed records for 21 stations supplemented by mean monthly and annual rainfall data for 664 stations. Relationships are shown in graphs, tables, charts and maps. The relation with height, amount of forest cover (%), distance from the sea and the orographic barriers are clearly brought out in the analysis. A seasonal effect of forest cover and elevation is made evident, as well as an effect on the total annual amount of precip. The factors are, however, interrelated. Formulas for effect of elevation are used to construct sea level isohyetal charts. *Subject Headings:* **1. Precipitation in Oder Basin 2. Forest influences on precipitation 3. Altitude effects on precipitation 4. Oder Basin, Poland.**—*M.R.*

9.1–108 628.1:634.956

Rennie, P. J., **Effect of the afforestation of catchment areas upon water yield.** *Nature*, London, 180(4587):663–664, Sept. 28, **1957.** 5 refs. **DWB**—Soil water observations on natural and afforested *Calluna* moor in Cleveland (Yorks) showed that in dry years afforestation through its effect on transpiration could reduce catchment yield by up to 3 cm water. More important is that deep ploughing which precedes planting trees, and tree roots, break up hard pan underlying *Calluna* moor and resulting increase of percolation results in watershed leakage. These factors are rarely important in impermeable rocks and higher rainfall of north and west Britain. *Subject Headings:* **1. Water supply 2. Afforestation.**—*C.E.P.B.*

9.1–109 551.5:632.1

Small, R. T. (*U. S. W. B. Airport Station, Boise, Idaho*), **The relationship of weather factors to the rate of spread of the Robie Creek fire.** *Monthly Weather Review*, Wash., D. C., 85(1):1–8, Jan. **1957.** 7 figs. (incl. photos), table, 4 refs. **DWB, DLC**—The Robie Creek fire in Boise National Forest, Idaho, Sept. 5–9, 1955, is described, and concurrent weather conditions are analyzed. The fire exhibits four different types of behavior during the five days. On four of the days, the behavior follows patterns previously recognized as being usually associated with the prevailing weather conditions. The exceptions occur on the third day, which is meteorologically similar to the second day but exhibits a different fire

behavior. Some implications that this study has for forecasting and research are pointed out. The meteorological conditions are illustrated by wind speed and temperature profiles, and the fire itself (and attendant fire whirls) by excellent photographs. *Subject Headings:* **1. Fire weather conditions 2. Fire spreading 3. Forest fire whirlwinds, Robie Creek, Idaho.**—*Author's abstract.*

INDUSTRIAL METEOROLOGY

See also: **Ice loads on communication wires** (Rastad), 9.1–247.

9.1–110 551.586:628.8

†Kufferath, August, **Klima-Anlagen für Industrie und Gewerbe, unter besonder Berücksichtigung der Textilindustrie.** [Air conditioning installations for industry and trades, especially the textile industry.] Berlin, Chemisch-technischer Verlag Dr. Gustav Bodenbender, **1956.** 368 p. 191 figs., 13 tables, 262 refs., bibliog. p. 339–346. **DWB**—In some respects this volume dealing with heating and ventilation resembles the ASHVE Guide but it is much less comprehensive in scope and applicability. It consists of eleven chapters which cover the following subjects: a general discussion of climate and its influence on man, industry and the production, storage and shipping of goods; the principles of climatic control which include the chemical and physical properties of the atmosphere, effect of heating, cooling, moistening and drying upon air, the movement and flow of air and atmospheric pollution, purpose of industrial air conditioning and the requirements of such industries as textiles, explosive manufacturers, food processing, etc., the requirements of stores, hotels, restaurants, schools, etc. and of underground installations; short history of air conditioning, air conditioning installation of simple and complex construction and a detailed account of the mechanical aids and machines involved; measuring devices used in air conditioning technology, namely: temperature, humidity, air movement, air quantity recorders, the katathermometer, etc., devices for controlling the operation of air conditioning installations; principles of planning air conditioning installations and a comprehensive bibliography. The text is provided with numerous photographs and diagrams and some numerical data are presented. In addition, the volume contains advertisements by the various German manufacturers of air conditioning equipment. A detailed subject and author index is included. *Subject Headings:* **1. Air conditioning 2. Textiles.**—*I.L.D.*

9.1–111 551.586:628.82:629.113

von Cube, H. L., **Klima im Auto.** [Climate in automobiles.] *Umschau*, 57(18):571–572, Sept. 15, **1957.** 4 refs. Also: continuation in *Ibid.*, 57(20):615, Oct. 15, **1957.** 3 figs., 3 refs. **DLC**—Summer climate of large parts of U. S. is so unbearable that houses, offices and factories are air-controlled. Since 1952 this has been extended to private cars and reached 500,000 installations by 1957. The first installations applied the usual cooling systems but completely new apparatus has now been designed. Outside U. S. there are no similar developments. The second article gives details of cooling units and in some cases the heating units. *Subject Headings:* **1. Air conditioning 2. Automobiles.**—*C.E.P.B.*

9.1–112 551.5:69 551.524.37:69

Bruckmayer, F. (*Vienna*), **Bautechnik und meteorologische Werte.** [Construction methods and meteorological values.] *Wetter und Leben*, Vienna, 7(8/11):186–193, **1955.** 5 photos, ref. **DLC**—The author discusses the meteorological data and know-how which is required by the city and regional planner, architect, heating and air conditioning technician, and the builder. The influence of meteorological elements upon the storing, shipment and use of building materials is illustrated by a discussion of frost effects upon roof tiles. The meteorological support in extending the period of building operations into the winter is discussed, with reference to wall building during light frost in Europe, concrete pouring during frost. Also the stress placed upon buildings by intense rain, high wind velocities, etc. is considered. *Subject Headings:* **1. Building construction 2. Frost effects on construction 3. Building resistance 4. Weather effects on building materials.**—*I.L.D.*

9.1–113 551.508.53/4:551.552(41/2):551.556.3:621.311.24

†Tagg, J. R., **Wind data related to the generation of electricity by wind power.** *British Electrical and Allied Industries Research Association, Technical Report,* C/T115, **1957.** 52 p. 34 figs., 9 tables (some fold.), 40 refs.—Presents the results of a wind survey of British Isles. Height of hill and mast and duration of wind measurements at 101 places are shown in a table and diagram and sites are described with sections. A large folding table gives monthly and yearly average wind speeds. Directions were measured continuously at 3 sites and velocity/frequency curves at 6 sites are converted into velocity/duration ogives. The operating limits and relationship between specific output and wind speed in British Isles are discussed. Variation of wind speed with height is next taken up, and represented by a power law with α(66 ft) between 0.095 and 0.15. Diurnal variations of wind speed are discussed and, finally, wind measurements overseas listed. Appendices describe anemometers and supporting structures, and recording instruments, used in the survey. *Subject Headings:* **1. Wind power projects 2. Electric power systems 3. British Isles.**—*C.E.P.B.*

MEDICAL METEOROLOGY

See also: **Sunspot effects on Takata reaction** (Kohler), **9.1–211.**

9.1–114 551.586:551.543:616.12

Gressel, Walter, **Zur Abhängigkeit des Myocardinfarktes vom Wettergeschehen.** [Dependence of myocardiac infarct on weather.] *Meteorologische Rundschau,* 10(4):128–129, July/Aug. **1957.** table, 2 refs. **DWB**—Occurrences of myocardiac infarcts in Vienna 1949–54 were examined. They were not closely related to passage of fronts, but to rapid pressure changes. Six weather situations are distinguished; only rapid pressure oscillations gave a positive result (197 cases with frontal passages, 6 without). Out of 846 cases of all types, 479 were associated with fronts (mostly cold fronts) and 367 with no fronts. *Subject Headings:* **1. Weather effects 2. Heart disease.**—*C.E.P.B.*

9.1–115 551.509:616:061

Aujeszky, László, **Az orvosmeteorológiai prognózisszolgálat bevezetésének szinoptikai kérdései.** [Synoptic problems connected with the establishment of a medical meteorological forecasting service.] *Időjárás,* Budapest, 60(6):365–375, Nov./Dec. **1956.** English summary p. 365. **DLC**—There is an increasing demand in Hungary for specialized forecasts for use by the medical profession. Surgeons try to avoid operations during weather changes because post-operative complications are more frequent at such times. Similar situations exist in other branches of medicine. The author discusses the meteorological aspects of a specialized medical forecasting service planned in Hungary. The elements to be forecast are frontal passages, air masses and duration of natural synoptic periods. The same elements serve as basis to the regular 36-hour forecasts of the Hungarian weather service. These forecasts are being continuously verified by an independent agency and have been found to have an accuracy of 90%. The medical forecasts would be even more accurate if in cases of doubt a "chance of occurrence" forecast would be issued instead of the "most probable" forecast. The synoptic forecasts would be communicated daily to a group of medical experts who would issue the final forecast and also maintain a consultant service for special problems. Personnel requirements of such a cooperative project are discussed and a daily work schedule is proposed. *Subject Headings:* **1. Medical meteorological forecasting service 2. Hungary.**—*G.T.*

9.1–116 551.555.8:616.1

Lemaire, R. and Jolly, R., **Action des vents de sable sahariens sur l'appareil cardio-vasculaire.** [Effects of Saharan sand storms on the cardiovascular system.] *La Médecine Aéronautique,* Paris, 12(2):161–166, **1957.** 4 refs. English summary p. 166. **DLC**—Data on blood pressure, pulse rate and body temperature observed in 13 individuals during exposure to a violent sand storm are tabulated and discussed. The individuals were exposed in the open (eastern Sahara) desert for a 3-day period in May 1956; their reactions were measured twice daily; the sandstorm occurred on the first day. Considerable hypertension, and increase in pulse rate and body temperature, was found to develop during the sand storm. *Subject Headings:* **1. Sandstorm effects on cardiovascular system 2. Cardiovascular system.**—*G.T.*

9.1–117 551.586:551.515.8:312.2

*Takáts, István and Somogyi, Endre, **Vizsgálatok a csecsemőkori hirtelen halál és az időjárásváltozások összefüggése kérdésében.** [Research of relations between sudden death of infants and weather changes.] *Időjárás*, Budapest, 60(6):375–379, Nov./Dec. 1956. 2 tables, 12 refs. Russian summary p. 375. **DLC**—Possible connections between sudden deaths of 145 infants under two years and meteorological factors are investigated. Only such cases were selected for this study in which the infant's death was not fully explained by autopsy. A definite relationship is found between sudden death of infants and the passage of warm fronts. No relationship could be established in respect to cold-front passages. *Subject Headings:* **1. Warm frontal passage effects on infant mortality 2. Mortality due to weather.** —*G.T.*

9.1–118 551.574.1:612.22

Verzár, F.; Hügin, F. and Massion, W., **Zurückhaltung atmosphärischer Kondensationskerne in den Atemwegen.** [Retention of atmospheric condensation nuclei in the respiratory tract.] *Pflügers Archiv für die Gesamte Physiologie*, Berlin, 261(3):219–233, **1955.** 7 figs., 2 tables, 19 refs. **DLC** (QP1.A63). Shorter version by VERZÁR in *Schweizerische Naturforschende Gesellschaft, Verhandlungen*, 134:117–118, **1954. DWB, DLC**—A detailed report on research with an especially constructed automatic condensation-nuclei counter which warms the air in the expansion tube and humidifier to 37°C (i.e., to lung temperature). The device was repeatedly calibrated against a Scholz counter. Tests were made with hound dogs and humans to determine amount of nuclei retained in nose and trachea (and also temp. and humidity in the respiratory organs) during inhalation and exhalation, respectively. Conclusions based on 12 tests on 3 days are: with dry room air 61% of the nuclei are retained in the trachea when breathing was through the mouth and 74% by the nose; for cigarette smoke filled air 67% for mouth and 79% for nose breathing, and for moist (80–90% r.h.) smoke filled air 37% and 64%, respectively, Even a dead dog retained 30–40% in the trachea during forced breathing and 68–80% in the nose and mouth. For men (11 tests) the figures were 30–40% for mouth and nose inhalation for room air and up to 90% retention for smoky air (figures are also given for exhalation and for mouth breathing). The importance of condensation nuclei is said to be in the toxic substances in the atmosphere that are contained in the water vapor which condenses on the nuclei and not in the size or amount of nuclei. *Subject Headings:* **1. Verzár automatic nuclei counter 2. Nuclei retention in respiratory tract.**—*M.R.*

METEOROLOGICAL OBSERVATIONS AND INSTRUMENTS

METHODS OF OBSERVATION

See also: **Space research and exploration** (Bates, Moore), 9.1–2; **Air-borne flight analyzer** (Van der Maas), 9.1–102; **Radar snow formation** (Wexler, Austin), 9.1–260; **Radiosonde electrical conductivity soundings** (Mühleisen), 9.1–285; **Aerovisual investigation of snow cover** (Kopanev), 9.1–261.

9.1–119 551.501:551.521.1:551.521.11

Ångström, Anders, **On the computation of global radiation from records of sunshine.** *Arkiv för Geofysik*, Stockholm, 2(22):471–479, **1957.** 2 tables, 22 refs., 11 eqs. **DLC**—Discusses the proper application of the author's formula $Q=Q_0[\gamma-(1-2)r_s]$ for the computation of the total global radiation on a clear day and the relative duration of sunshine r_s. Instrumental problems are emphasized. A similar equation developed by PRESCOTT, relating Q to the theoretical radiation received with a perfectly transparent atmosphere, is favorably discussed and the possibilities for constructing a world map of global radiation are analyzed. *Subject Headings:* **1. Global radiation calculation 2. Sunshine duration 3. Radiation charts** —*A.A.*

9.1–120 551.501.

*Verploegh, G., **The equivalent velocities for the Beaufort estimates of the wind force at sea.** *Netherlands. Meteorologisch Instituut, Mededelingen en Verhandelingen*, No. 66, 1956, 38 p. 17 tables, 16 refs. **DLC**—In order to determine the accurate equivalents for wind estimates made on the Beaufort scale, two Netherlands lightships were equipped with ane

nometers, mounted 7 m above the sea. Readings made in 1950 and 1951 were compared with routine Beaufort observations and the results found to be very close to those made on German lightships in the North and Baltic Seas, and on ships at sea, but to differ from those made at English land or coastal stations and adopted for international use in converting anemometer readings on land to Beaufort Force for marine use or vice versa. Details of the comparisons are presented in tables and graphs and discussed. At high velocities large corrections must be made. *Subject Heading:* **1. Beaufort wind equivalent accuracy.**—*M.R.*

9.1–121 551.501.45:551.557

Durst, C. S., **A statistical study of the variation of wind with height.** *Great Britain. Meteorological Office, Professional Notes*, 8(121), **1957.** 10 p. 3 figs., 10 tables, 6 refs., 5 eqs. **DWB**—Vector correlation is explained. Correlation between winds at 900 mb and 700–100 mb at Liverpool showed that stretch was important but simple turn could be neglected. Vector correlations are given between 2 heights at a number of stations in different parts of the world, including 50,000–80,000 ft and 80,000–100,000 ft over England. *Subject Headings:* **1. Vector correlation 2. Wind variation with height.**—*C.E.P.B.*

9.1–122 551.501.7:551.557

Gould, Royal C. (*Atmospheric Studies Branch. Instrument Operations Division. Test Dept.*), **An investigation of rawinsonde data techniques for computing winds aloft.** *U. S. Naval Ordnance Test Station, China Lake, Calif., NAVORD Report*, 5318, Sept. 15, **1956.** 60 p. 4 figs. **DWB**—Computation of winds aloft for 1-minute instead of 2-minute (2000 ft) deep layers (readings every ½ minute instead of every minute) shows the current method using the plotting board and rawin data obtained every minute to be highly inaccurate, especially from the surface to 5000 ft elevation. Every transposition from graph to data sheet to plotting board to height graph (for interpolation) involves error. A more direct method which eliminates some of these steps, is described. This method is not at present adaptable for operational use, but readings at ½ minute intervals to 5000 ft could be made at present. *Subject Headings:* **1. Upper air wind plotting 2. Upper air wind accuracy.**—*M.R.*

9.1–123 551.501.7(09)(98,99)

†Loewe, F., **Some early observations of the free atmosphere in high latitudes.** *Meteorological Magazine*, London, 86(1023):276–278, Sept. **1957.** 32 refs. **DWB**—A history of upper air temperature observations in the Arctic and Antarctic since Jan. 26, 1822, when a thermometer was raised by kite to 400 ft at Winter Is. (66°11′N). In the Antarctic first sounding balloon flights were made in 1911. *Subject Headings:* **1. Upper air observation 2. History of meteorology 3. Arctic 4. Antarctica.**—*C.E.P.B.*

OBSERVATIONAL DATA

See also: **Upper air wind measurement** (Barbe), 9.1–17; **Long period records, Vienna** (Steinhauser et al.), 9.1–30; **Ionospheric data yearbooks** (Little), 9.1–62; **Lightship observation data** (Hamburg. Seewetteramt), 9.1–87; **Airplane measurements of gustiness** (Walker), 9.1–101.

9.1–124 551.506(783)

*Hodge, William (*State climatologist, Huron, S. D.*), **Average temperature and moisture, 1931–1955, South Dakota.** Huron, South Dakota, U. S. Weather Bureau, **1957.** 7 p. Mostly tables. **DWB** (M82.2/783 U587av)—Summarized average monthly temperature and precipitation data for 25 years for 72 stations in S. Dakota, plus averages for each of 9 sections into which the state is divided. A brief introduction compares this 25 year period with 1891–1930 (it was drier on the average and slightly warmer) and with 1931–55 data for 8 other U. S. cities. *Subject Headings:* **1. Climatic data for South Dakota 2. South Dakota.**—*M.R.*

9.1–125 551.506:551.524.36(783)

*Pengra, Ray F., **Yearly dates of last spring and first fall occurrence of minimum temperature of 28°F or lower for 58 Weather Bureau stations of South Dakota.** *South Dakota.*

Agricultural Experiment Station, Brookings. Agricultural Economics Pamphlet, No. 79, Jan. **1957.** unpaged. entirely tables (58 tables). **DWB** (M:63 S726a)—This is the first of 3 pamphlets giving data (printed from punched cards) for 58 stations in South Dakota on the duration of the season between the last (in spring) and the first (in fall), occurrence of 28°F or lower plus the actual dates in each year of record (1881–1955) for which data are available. The other two publications will cover 32° or lower and 24° or lower. (*See also* 6.8–87, Aug. 1955, *MAB.*) *Subject Headings:* **1. Freezing temperature data 2. South Dakota.**—*M.R.*

9.1–126 551.506:551.524.36(783)

Pengra, R. F. (*comp.*), **Temperature summary of data for 60 South Dakota weather stations from the start of continuous records for each station through 1954.** *South Dakota. Agricultural Experiment Station, Brookings. Agricultural Economics Dept., Pamphlet*, No. 77, Jan. **1957.** 6+60 p. almost entirely tables. **DWB** (M635726 No.77). Also his: **Yearly dates of last spring and first fall occurrence of minimum temperature of 24°F or lower for 58 Weather Bureau Stations of South Dakota.** *Ibid.*, No. 78, Jan. **1957.** (64 p.) almost entirely tables. **DWB** (M635726a No. 67)—Average weekly maximum and minimum temperature data for entire period of continuous record for 60 stations in South Dakota are presented in tables (separate sheet for each station) in the first paper. Frequency of temperature was $\geq 90°$, $\leq 32°$ (maximum and minimum) or $\leq 0°$F (minimum). The tables are printed directly from punched cards. Weeks are identified by numbers beginning with March 1 and frequencies are total number of cases for period of record (which being variable makes the data not comparable from station to station without dividing through by the number of years). The second paper is a compilation similar to that for dates of 28°, and of 32°F or lower for the same stations in South Dakota. (*See also* 6.8-87, Aug. 1955, *MAB.*) *Subject Headings:* **1. Temperature data for South Dakota 2. Frost hazard data 3. South Dakota.**—*M.R.*

9.1–127 551.506:551.55:629.123

*Sternzat, M. S., **Pogreshnosti izmereniia skorosti i napravleniia vetra na korable.** [Errors in measuring wind direction and speed from ships.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy*, 61(123):147–154, **1956.** 4 figs., 4 tables, 17 eqs. **DWB**—A theoretical analysis, and a reappraisal of the problem which is necessary in view of the fact that the speed of modern ships has increased and often exceeds the speed of wind to be measured from the ship. Data on magnitude of errors under various wind directions and speed conditions are presented in tables and curves which would be useful in actual ship observations. *Subject Headings:* **1. Wind velocity measurements from ships 2. Wind measurement errors.**—*A.M.P.*

9.1–128 551.506.3:551.553.8(268, 269,98,99)

*†Lamb, H. H., **On the frequency of gales in the Arctic and Antarctic.** *Geographical Journal*, 123(3):287–297, Sept. **1957.** 4 figs., 7 tables, 40 refs. **DWB**—Gives maps of percentage of observations with gale (Bft ≥ 8) between Greenland and Novaya Zemlya, 1930–35 (land) and 1933–37 (sea) compared with 1945–49 (land) and 1855–1954 (sea). There has been a decrease since 1930 at most northerly stations in Greenland and Iceland. For the Antarctic fragmentary data from different periods are combined, but long record at Lauric Island shows no significant fluctuation since 1906. A map is given for Oct.–March 1899–1954 including reports of sledging parties. Distribution is discussed. Frequency on Adélie Land coast is locally over 50%; other windy regions are mountain girt valleys (katabatic winds) and mountainous sections of the coast ("frontal funnel" gales) illustrated by a synoptic char of south Greenland. *Subject Headings:* **1. Gale frequencies 2. Arctic 3. Antarctica.**—*C.E.P.B.*

9.1–129 551.506.7(52):551.508.822

*Japan. Central Meteorological Observatory, Tokyo, **Aerological data of Japan: 5-year period averages (1951–1955) radiosonde data.** March **1956.** 123 p. almost entirely tables **DWB** (M06.7/52 J35ag 1951–1955)—In this edition, data for 1951–1955 for 11 radiosond

ations in Japan (including Kagoshima, Marcus Islands and Ocean Weather Station "Tango") e presented. The 00h and 12h average monthly height, T and number of observations are ven for each standard pressure surface up to 15, 10 and in one case even 5 mb (36 km) as well the relative humidity, dew point and extreme monthly maximum and minimum temp. and te for each level. Averages are computed in 2 different ways for 100, 80, 60, 40, 30, 20, 5, 10 and 5 mb levels: (1) average of total number of observations, and average of each year's erage for that month. The lowest temp. recorded in the 5-year period was −86.2°C at mb (Marcus Feb. 11, 1957). No radiation corrections are applicable. The first radiosonde as launched in June 1938 at Fusa. (For abstract on earlier issues, *see* 4.3–46, March 1953, *AB.*) *Subject Headings:* **1. Upper air data 2. Radiosonde data 3. Japan.**—*M.R.*

9.1–130 551.506.8(426)

Balls, W. Lawrence, **The spring garden of 1957.** *Weather*, 12(9):286–287, Sept. **1957.** g., 2 refs. **DWB**—Phenological chart for 1949–1957 at Cambridge, Eng., shows remarkable rliness of flowering in 1957. *Subject Headings:* **1. Phenological data 2. Cambridge, Eng.**—*E.P.B.*

9.1–131 551.506.8:061.3

Schnelle, F. and Volkert, E., **Vorschläge zur Einrichtung "Internationaler Phänologischer ärten" als Stationen eines Grundnetzes für internationale phänologische Beobachtungen.** Advantages of "International Phenological Gardens" as stations of a network of phenological bservations.] *Meteorologische Rundschau*, 10(4):130–133, July/Aug. **1957.** table. **DWB**— is often difficult to compare phenological observations in different countries. In 1953 the gricultural Meteorology Commission planned "Phenological First Order stations" including henological gardens in partly protected sites. Conditions for uniformity are laid down. ists of plants (minimum and supplementary) are given for different countries of Europe. ach garden should if possible contain at least 3 examples of each species. A second part of ie garden is devoted to replacements. There will be a further reserve at the Institute for lant Breeding. Observations will be published regularly. *Subject Headings:* **1. Phenology International Phenological Garden.**—*C.E.P.B.*

INSTRUMENT CARRIERS

See also: **Space research and exploration** (Bates, Moore), 9.1–2; **Rockets in ionosphere research** (Burgess), 9.1–10; **Satellite determination of ionospheric structure** (Berning), 9.1–91; **Satellite instrumentation** (deBey), 9.1–92; **Satellite propagation experiment** (Hartman, Hairland), 9.1–93; **Future of earth satellite** (Hairland), 9.1–94; **Satellite geomagnetic observation** (Katz), 9.1–96; **Airplane measurement of gustiness** (Walker), 9.1–101; **Instrumentation for determination of electron density** (Haycock), 9.1–176; **Aerovisual investigation of snow cover** (Kopanev), 9.1–261.

9.1–132 551.507.321

Lynch, Charles, **Device for balloons aids cosmic ray research.** *Weather*, 12(9): plate 35, pt. **1957.** photo. **DWB**—Describes a light aluminium tube with a ping-pong ball valve r extending height range of balloons, described by V. Hopper for cosmic ray research in ustralia. *Subject Heading:* **1. Balloon accessories.**—*C.E.P.B.*

9.1–133 551.507.321

Rand, William M., Jr., **Dewey and Almy Chemical Company—manufacturers of meteorological balloons.** *American Meteorological Society, Bulletin*, 37(3):118–120, March **1956.** g., 3 photos. **DWB**—A description is given of the making of high altitude sounding balloons nd of the various types of such balloons made by this company since 1935, namely: ceiling lloons, pilot balloons, sounding balloons, captive balloons and kytoons. A graph showing ght characteristics of the Darex J9-42-7000 gram meteorological balloon and photographs ustrating some aspects of balloon manufacture are presented. *Subject Headings:* **1. Sounding lloons 2. Balloon manufacture.**—*I.L.D.*

INSTRUMENTS

See also: **Instrument calibration**, 9.1–35; **Air-borne flight analyzer** (Van Der Maas), 9.1–102; **Wind power projects** (Tagg), 9.1–113; **Radiosonde data, Japan**, 9.1–129; **Infrared spectroscopy** (Butler), 9.1–206; **Smoke puff diffusion experiments** (Senaca), 9.1–227; **Nuclei counters** (Herpertz, Verzar), 9.1–243; **Soil moisture instruments** (Lauscher), 9.1–266.

9.1–134 551.508:551.584

Platt, Robert B. (*Dept. of Biology, Emory Univ., Georgia*), **A field installation for automatic recording of micro-environmental gradients.** *American Geophysical Union, Transactions,* 38(3):166–170, April **1957.** 3 figs., 5 refs. **DWB, DLC**—A laboratory has been constructed in the field with a design sufficiently basic and flexible to permit correlation of micro-environmental conditions with distribution and abundance in space and time of a wide variety of plants and animals. Two 50-ft wooden towers, located at ecological extremes of a dense woodland and an open field in Baker County, southwest Georgia, have been equipped with instruments for automatic recording of micro-environmental gradients. Aminco-Dunmore-type electric humidity and temperature indicators have been placed at the 0, 3, 6, 15 and 50 ft levels, and temperature elements only at the 1, 16, 18 and 36 in soil depths, each complete set being fed into a 16-point strip recorder. Special weather shields have been designed for the humidity-temperature indicators. Recording anemometers are at the 3 and 50 ft levels and recording rain and surface water level gages are near the base of each tower. Portable instruments provide for supplementary environmental data on radiation, light, wind, temperature and humidity. *Subject Headings:* **1. Micrometeorological instrumentation 2. Baker County, Ga.**—*Author's abstract.*

9.1–135 551.508.49:629.13

British Standards Institution, **British standard specification for sensitive altimeters for aircraft.** Its 2*G*.115, Dec. **1956.** 6 p. 4 tables.—Revised British Standard taking account of I.C.A.O. Standard Atmosphere, −1000 to 35,000 ft and −1000 to 50,000 ft. General requirements, adjustment, calibration and tests are described, permissible errors listed and fiducial temperatures and temperature corrections given for various latitudes and heights. *Subject Heading:* **1. Altimeters.**—*C.E.P.B.*

9.1–136 551.508.53/4

D'iachenko, P. V., **Ustanovka dlia poverki ruchnykh anemometrov.** [A device for checking the accuracy of hand anemometers.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy,* 61(123):105–114, **1956.** 6 figs., 2 tables. **DWB**—A detailed description of the construction and results of the first testing of a small size economical device for verifying the accuracy of hand anemometers, devised by the author, and constructed in 1954 in the Central Laboratory of the Main Geophysical Observatory (GGO). Calibration curves are presented and explained. *Subject Headings:* **1. Hand anemometers 2. Instrument accuracy**—*A.M.P.*

9.1–137 551.508.77

Hasegawa, Saburo; Garfinkel, Samuel B. and Wexler, Arnold (*all, Nat. Bureau of Standards, Wash., D. C.*), **Simple humidity lag apparatus.** *Review of Scientific Instruments,* N. Y. 26(12):1196–1197, Dec. **1955.** 2 figs., 4 refs. **DWB, DLC**—A simple apparatus for producing humidity step-functions at room temperature, using saturated salt solutions to maintain constant relative humidities, is described. For an air flow of 200 lpm, the time required to change from one relative humidity to another is of the order of 30 to 50 milliseconds. This apparatus is particularly useful for establishing the lag characteristics of hygrometer elements. *Subject Headings:* **1. Hygrometer lag 2. Hygrometer testing.**—*Authors' abstract.*

9.1–138 551.508.77

Kawano, Y., **Self-recording-evaporimeter with temperature compensator.** *Journal of Meteorological Research,* Tokyo, 6(6):207–208, July **1954.** 2 figs., eqs. In Japanese; English summary p. 207. **DWB**—The author found the necessary condition to be satisfied to avoid the lateral displacement of float in evaporimeter due to the change of water temperature

ıe relation is: $V=sL$, in which V is the volume of float dipped in the water, s the sectional ea of the float crossed at the water level and L the water depth of evaporimeter. The errors ming from the small difference from the above relation are very small so far as the water nperature changing within 20°C a day. *Subject Headings:* **1. Evaporimeters 2. Recording struments.**—*Author's abstract.*

9.1–139 551.508.72:551.573

Parthasarathy, K. and Misra, R. K. (*both, Met. Office, New Delhi*), **Comparison of pan d Piche evaporimeters.** *Indian Journal of Meteorology and Geophysics*, Delhi, 6(2):197–201, pril 1955. 3 tables, 3 refs. **DWB, DLC**—Daily observations of Piche and pan evaporimeters re made at Jodhpur, New Delhi, Lucknow and Allabahad in order to evaluate the conversion Piche evaporation to evaporation from free water surfaces. Mean monthly ratios of pan Piche evaporation for each station, rates of evaporation from standard pan to Piche for ch month and correlations between records of Piche and United States open pan evap- imeters are presented in a table. For these stations the factors 1.410 and 0.880 serve to nvert Piche data to standard pan evaporation for July to Sept. and other months of the ar, respectively. *Subject Headings:* **1. Pan evaporimeters 2. Piche evaporimeters 3. Evap- ation measurements 4. India.**—*I.L.D.*

9.1–140 551.508.72

Vilkner, Hans, **Ein Gelände-Verdunstungsmesser.** [Soil-evaporation measuring in- rument.] *Zeitschrift für Meteorologie*, 8(7/8):247–251, July/Aug. 1954. 3 figs., table, refs. German summary p. 247. **DWB**—An evaporimeter based upon the Piche principle described. This evaporimeter possesses a temperature equalizing tube, which enables the rface of the evaporating body to be evenly moist in spite of rainfall and warming up, and events the dripping of water during frequent alteration of sunshine and shade. The special aracteristics of this evaporimeter are its light weight, small size and easy transportability. ccordingly, these properties make this instrument especially suitable for use in the country ring the growing season. It is constructed so as to use also rainfall water for evaporation. *bject Headings:* **1. Evaporimeters 2. Evaporation measurement.**—*Based on author's abstract.*

9.1–141 551.508.74

Slootamekers, P., **Dauwpuntmetingen.** [Dew point measurements.] *Belgium. Régie s Voies Aériennes. Service Météorologique, Bulletin Trimestriel*, March/May, 1955, p. I–X. figs., 5 graphs, 2 tables, 8 refs. In Flemish; English and French summaries preceding p. I. **WB**—A table showing the characteristics of various instruments measuring atmospheric oisture content is presented. The "Dewcell" type dewpoint and dry temperature recorder veloped by Philips Co. is described, a schematic diagram shown, and its operation discussed. esults of experimental measurements made with the instrument are presented. *Subject eadings:* **1. Dew recorders 2. Dew measurements.**—*G.T.*

9.1–142 551.508.762:551.576.4

Fateev, N. P., **K metodike opredeleniia vysoty nizhneĭ granitsy oblakov.** [Methods for termining cloud base height.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy*, (123):137–142, 1956. 3 figs., 14 refs. **DWB**—In view of the lack, in the U.S.S.R. and road, of a simple and reliable device for a quick determination of cloud base heights, the thor reviews the practical schemes, developed recently in the U.S.S.R. and abroad, which uld be used as a basis for the creation of such photoelectric apparatus for the use of stations the U.S.S.R. hydrometeorological network. *Subject Heading:* **1. Cloud base height in- cators.**—*A.M.P.*

9.1–143 551.508.762:551.576.4

Vorob'ev, I. E., **K voprosu o vysotakh oblakov.** [The problem of cloud heights.] *Lenin- ad. Glavnaia Geofizicheskaia Observatoriia, Trudy*, 61(123):143–146, 1956. **DWB**—The thor examines the problem of the reliability of determinations of cloud base heights, and so some problems of critical evaluation of cloudiness observations. The work is based on oud height data, obtained by pilot balloon observations at 4 stations during a whole year,

and by visual determinations made at 9 stations during the months of Jan., April, July a Oct. *Subject Headings:* **1. Cloud height estimates 2. Cloud height data 3. U.S.S.R.**— *A.M.P.*

9.1–144 551.508.79:551.579

Johnson, William B., Associates, Inc. (*Empire State Bldg., N. Y.*), **Soil moisture mete** *Review of Scientific Instruments*, 26(10):1002, Oct. **1955.** photo. **DLC**—Fast neutrons a slowed more by collision with atoms of low atomic weight than by high atomic weight atom Hence slow neutron count returning from moist substances will give a direct indication moisture content if most of the hydrogen is in the form of water (since hydrogen has the lowe atomic weight of all elements). The equipment described and illustrated consists of a 5 m Ra-Be fast neutron source, a B-10 lined slow neutron counter all in one unit—the detecto which may be a cylinder or flat assembly, and a rate meter, which is connected by a 10 cable to the detector. It takes 2 min for the rate meter to stabilize after which readin may be made every 40 sec. No corrections are needed. *Subject Headings:* **1. Soil moistu instruments 2. Neutron counter.**—*M.R.*

9.1–145 551.508.79:551.579

Kreutz, Wilhelm, **Volumetrische Bodenfeuchtemessungen.** [Volumetric measuremen of soil moisture.] *Germany. Deutscher Wetterdienst, Mitteilungen*, 2(14):188–191, 195 2 figs. **DWB**—The author describes a volume borer and a device for direct determination soil moisture developed by H. Schupp at the agrometeorological station at Giessa. Th water content is determined by extracting and condensing the water vapor. A photograp of the volume borer is presented and the procedure is described. *Subject Heading:* **1. So moisture instruments.**—*I.L.D.*

9.1–146 551.508.9:551.594

Jacka, F. and Ballantyne, J., **Instruments and methods for auroral observation.** *Au tralian National Antarctic Research Expeditions, Interim Reports*, No. 11, Nov. **1955.** 35 10 figs. (incl. photos), 2 refs. **DWB**—Instruments and methods of auroral observation Macquarie (61°S geomag.) and Mawson (73°S) used by personnel in ANARE expeditio are set forth in this manual. Identification of forms, estimation of intensity, descriptio of occurrence, accuracy of direction measurements, timing, sketching, etc., are first outlin and then a simple open sight theodolite for measuring azimuth and elevation of any point an aurora to 0.1° in about 5 sec., is described in detail and illustrated. Care and testing a also covered. The theodolite was used successfully at MacQuarie Island. A photo theodolit accurate to 1 min, is also described at length and illustrated and the details shown schematicall Two have been used for a year at Macquarie Island. *Subject Headings:* **1. Auroral instrumen 2. Auroral observation 3. Macquarie Island.**—*M.R.*

9.1–147 551.508.

Gabor, D. and Hampton, B., **A Wilson cloud chamber with time-marking of partic tracks.** *Nature*, London, 180(4589):746–749, Oct. 12, **1957.** 2 figs. **DWB**—Describes method of turning a Wilson cloud chamber into a resonating cavity, giving a multiplicati of secondary electrons at peak intervals of 10^{-10} sec, producing a periodic thickening of th tracks. *Subject Heading:* **1. Cloud chambers.**—*C.E.P.B.*

9.1–148 551.508.952:551.510.53

Kulcke, Werner and Paetzold, Hans-Karl, **Über eine Radiosonde zur Bestimmung d vertikalen Ozonverteilung.** [A radiosonde for determining the vertical distribution of ozone *Annalen der Meteorologie*, 8(1/2):47–53, **1957.** 6 figs., 4 refs. **DWB**—An optical ozone son was constructed using wave lengths of 3250 Å (absorption 0.2/cm) and 3000 Å (4.8/cm Properties of various filters are described. As a light receiver a Se-photocell with quar window was selected. The light falling on the photocell is cut to a frequency of 50 pers by a toothed wheel and magnified 1000 times by a simple 3-stage strengthener. Block diagra of the set up and calibration scheme are given and specimen of vertical distribution show *Subject Heading:* **1. Ozone radiosondes.**—*C.E.P.B.*

SYNOPTIC ANALYSIS AND FORECASTING

See also: **Math. in action** (Sutton), 9.1–11; **Synoptic-aerological study of fog** (Bintig, Markgraf), 9.1–18; **Synoptic charts of hurricanes** (U. S. W. B.), 9.1–32; **Synoptic charts, Southern Ocean** (Radok), 9.1–63; **Numerical forecasting** (Starr, Gates), 9.1–182; **Medical met. forecasting** (Aujeszky), 9.1–115; **Tornado damage** (Chase), 9.1–193.

9.1–149 551.509.1:621.397.9

Seilkopf, H., **Eine bedeutsame Neuerung im Seewetterdienst: Bildfunk-Spezialwetterten für Handelsschiffahrt, Seefischerei und Hochsee-Segelsport.** [An important novelty the Marine Weather Service: Facsimile special weather charts for ships.] *Wetterlotse*, 117:113–117, May **1957.** 3 figs. **DLC**—The charts transmitted from Frankfurt can be eived as far as Spitsbergen on the large Hellfax, but this is costly and a Kleinfax receiver been developed giving a chart 19×13.8 cm. Transmissions planned are listed. *Subject ading:* **1. Facsimile weather maps.**—*C.E.P.B.*

9.1–150 551.509.31:551.510.5

Korejs, Zdeněk, **Sledování vertikálního zvrstvení atmosféry na horizontální povětrnostní pě.** [Analysis of vertical atmospheric stratification from horizontal weather maps.] *teorologické Zprávy*, Prague, 7(5):129–130, **1954.** table, ref. Russian and German sumries p. 129. **DLC**—A method is described for quick appraisal of stability in the lower f of the troposphere. From the actual temperature at 500 mb a theoretical temperature file up to that level (by 1°C intervals) is first calculated, assuming moist adiabatic condins. A comparison of the values thus obtained with the actually measured temperature se rate serves as an index of stability. 12-hour changes of that index number (which is now ng mapped in the Czechoslovak Synoptic Service for 3 a.m. and 3 p.m. on a trial basis) icate positive or negative tendency of stabilization. Some definite results have already n achieved in short-range forecasting. *Subject Headings:* **1. Stratification of atmosphere Stability index 3. Short range forecasting.**—*G.T.*

9.1–151 551.509.312

†Haarländer, Hans, **Eine kinematische Methode zur Vorhersage wahrer Luftbahnen mit spielen, I.** [Kinematic method for forecasting true trajectories, and examples, Pt. 1.] *many. Deutscher Wetterdienst, Berichte*, 5(31), **1957.** 23 p. 40 figs., 57 refs., 12 eqs. **/B, DLC**—This paper is concerned with a new rapid method for constructing trajectories h reference to the transport of radioactive aerosols. This method is based upon theoretical cepts of G. Hollmann. It takes into account the translation of the initial pressure field l neglects turbulence and frictional forces. The trajectories are approximated geostrocally since owing to lack of measurements ageostrophic improvements cannot be utilized. means of this method the trajectories of a drift system can be rapidly constructed graphically a large section of charts whereby also local temporal pressure changes (developments) can considered. Several examples are discussed. These are trajectories in a straight line allel pressure field, a cyclone with constant and variable pressure gradients during different nslation velocities, a numerical example and an actual weather situation. Particle transt through the atmosphere for different natural phenomena are analyzed, namely: Krakatoa ptions, the deposition of the Laucher-See tuffs as a result of volcanic eruptions of 10,000 ., the smoke distribution in connection with the Canadian forest fires of Sept. 1950, and nsport of Sahara sand. *Subject Headings:* **1. Trajectory forecasting 2. Kinematics.**—*.D.*

9.1–152 551.509.317

Dahler, Hermann, **Über die prognostische Auswertung der Radarwindmessungen.** [On pronostic use of radar wind observations.] *Annalen der Meteorologie*, 8(1/2):59–62, **1957.** gs. **DWB**—The period after 1918 was characterized by aircraft and later radiosonde ervations and their application to short-period forecasts through advective temperature nges and wind shear, especially in the upper troposphere. The lack of humidity values

from the upper troposphere can be remedied by cloud and rainfall observations. *Subject Heading:* **1. Upper air analysis.**—*C.E.P.B.*

9.1–153 551.509.317:551.54

†Piper, Horst, **Die Höhenvorhersagekarte.** [Upper air forecasting charts.] *Germany Deutscher Wetterdienst, Mitteilungen*, No. 10:45–49, Feb. **1955.** 15 refs.—Discussion o practical problems of construction of upper air prognostic charts and application of theor of horizontal warm air advection, vertical motions, orographic effects, cyclogenetic indication etc. to construction of 24-hour prognostic charts for the 700 and 500 mb level. *Subject Head ings:* **1. Upper air prognostic charts 2. Analysis centers 3. Western Germany.**—*M.R.*

9.1–154 551.509.317(02

†Pogosian, Kh. P. and Taborovskiĭ, N. L., **Ukazaniia k sinoptikoaerologicheskomu analizu** [Guide to synoptic-aerological analysis.] Moscow, Gidromet. Izdat., **1940.** 40 p. 30 figs. refs., bibliog. p. 40. **DLC** (QC878.P57)—One of the earliest attempts outside of Germany t formulate a scheme for routine synoptic analysis of charts of upper air topography. Leve considered there are 1000, 900, 700, 500 mb and differences between heights of these surface Most of the attached charts however, are for the 500 mb level. Several situations are th analyzed and compared with surface charts. *Subject Headings:* **1. Synoptic aerology 2. Syn optic analysis 3. Handbooks.**—*M.R.*

9.1–155 551.509.3

Douglas, C. K. M., **Local weather forecasting.** *Weather*, 12(9):269–274, Sept. 195 2 tables, 3 refs. **DWB**—Local forecasts are short period precursors of official forecast largely on the basis of clouds. Weather Lore can be explained by observable present condition The popular saying that exceptional visibility is a sign of rain is tested by visibility of Portlan Bill from Beer (21 mi), and found to have some validity. *Subject Heading:* **1. Local forecastin** —*C.E.P.B.*

9.1–156 551.509.52:551.515

*U. S. Weather Bureau, **Tornado composite charts.** Wash., D. C., Feb. 16, **1954.** 2 20 charts (fold.). **DWB** (M15.3 U587tg)—Composite charts for major tornado days (da when 3 or more tornadoes occurred in one area, and 2 at least 100 mi apart) for 5 sectors of t U. S. tornado belt (ranging from Kansas to Texas and east to Georgia) are presented for t surface 850, 700 and 500 mb levels (300, 200, and 100 mb levels were prepared but are n included.) Data used were the 1500 GMT (58 cases) and 0300 GMT for the remainder the 72 cases for 6 seasons (1945–1950). The charts present the average situation occurri from 0 to 12 hours prior to the outbreak of tornadoes in each of these 5 areas. Dew poin are calculated from average temperature and average relative humidity; charts cover the ent U. S. and include temperature, height, dew point and number of cases for each upper sounding station and lines for each of the elements. No conclusions are drawn. *Subj Headings:* **1. Tornado composite charts 2. Tornado forecasting 3. Objective tornado fo casting 4. Tornado belt, United States.**—*M.R.*

9.1–157 551.509.52:550.3

§*Westerhausen, H., **Über die Ortung mikroseismicher Unruheherde.** [The location microseismic storms.] *Annali di Geofisica*, Rome, 7(1):71–124, Jan. **1954.** 49 figs., 8 tabl 10 refs. German, Italian and English summaries p. 122–124. **DLC**—Statistical, seismologi and synoptic aspects of microseisms in N.W. Europe are thoroughly treated in this artic with numerous cases discussed and illustrated by records and synoptic charts, etc. T methods of locating source of microseisms are emphasized: 1) the sounding method—directio location and 2) intensity method—determination of distance from station and whether not the storm is stationary or moving. Records from Hamburg, Uppsala, DeBilt, Gr Raum and Reykjavik are used. *Subject Headings:* **1. Microseismic storm detection 2. Sto microseisms 3. Northwest Europe.**—*M.R.*

9.1–158 551.509.532

Allen, Charles C. (*Weather Bureau Off., Pomona, Calif.*), **A simplified equation for minimum mperature prediction.** *Monthly Weather Review*, Wash., D. C., 85(4):119–120, April **1957.** g., 8 refs., 6 eqs. **DWB, DLC**—A modification of Ångström's 1920–22 formula (*see* 4C–113, larch 1953, *MAB*) which avoids use of tables, has been used since 1942 to forecast frost or eezing temp. in the Lindsay and the Modesto, Calif. fruit-frost districts and has been found give accurate results on clear calm nights in winter and spring. The formula $T_m = T_w - 1/4$ $(Td+16)$, where T_m = minimum temp. forecast (°F), T_w is wet-bulb temp. at 4:45 p.m. .S.T. and Td the dew-point at 4:45 p.m., could be modified to data for climatically similar calities or even tested for different situations. The empirical curve of Td against $T_w - T_m$ ows a good linear form with plotted points falling very close to the curve (range of $T_w - T_m$ <3.5°F) for a given value of Td. *Subject Headings:* **1. Minimum temperature forecasting rmulas 2. Ångström's formula.**—*M.R.*

9.1–159 551.509.62

Morgen, A., **Zur Frage des Wasserbedarfs bei der Frostschutzberegnung.** [The water ed in frost protection.] *Meteorologische Rundschau*, 10(4):133–135, July/Aug. **1957.** fig., tables, 11 refs. **DWB**—Research at Treves is devoted to fighting vegetation frost. The uestion of watering needed is discussed. In experiments −6.8°C at 9.20 was raised to −0.2 +1.5 at 12.30 (in open −2.0), and −12 to −13°C at 7.30 to −0.5 to −1.0 at −12.0 (open -3.2°C). A sprinkling of 1.6 mm/hr is sufficient in the strongest frosts. *Subject Heading:* **Frost protection.**—*C.E.P.B.*

9.1–160 551.509.67

Krick, Irving P., **Results of cloud-seeding operations to augment municipal water supplies.** *merican Water Works Association, Journal*, 48(10):1250–1263, Oct. **1956.** 6 figs., table, refs. **DLC**—Isohyetal and other charts are presented to show an apparent increase in ecipitation during 1953, 1954 and 1955 or one or two of these years, at Dallas, Oklahoma ity, Springfield, Mo., Shreveport, La., and Denver, Colo., during storms when the Water esources Development Corporation (of which the author is head) seeded targets in the reser- ir watersheds (with AgI from ground generators). Only a portion of the added water in e reservoirs, or extra precipitation, is attributed to cloud seeding, but the author presents gures which attempt to show that cloud seeding is the most economical method of increasing ater supply, ground water or soil moisture for farming. Principles of cloud seeding as well case histories are treated. *Subject Headings:* **1. Cloud seeding case histories 2. Economic lue of cloud seeding 3. Dallas, Tex. 4. Denver, Colo. 5. Oklahoma City, Okla.**—*M.R.*

STRUCTURE AND PHYSICS OF THE ATMOSPHERE

COMPOSITION OF THE ATMOSPHERE

See also: **Martian atmosphere** (Levitt), 9.1–14; **Infrared spectra of atmos. gases** (Benedict), 9.1–205.

9.1–161 551.510.41:546.214

Paetzold, Hans-Karl and Zschörner, Helmut, **Typische Schwankungen des totalen zonbetrages in Weissenau.** [Typical variations of the total amount of ozone at Weissenau.] *nnalen der Meteorologie*, 8(1/2):54–58, **1957.** 7 figs., ref. **DWB**—Intensity variations take count of haze and Rayleigh extinction, the first being variable. Total ozone content in ring increases some days before incursion of cold air on ground. The lower maxima (15 d <10 km) are characteristic. Warm air of 28/29.2.1956 coincided with a rapid decrease ozone below 10 km. On 31.3.1956 ozone decreased in rear and increased in front of a high. föhn outbreak of 21.3.1956 was preceded by several hours by an increase of ozone by 9%. nally, simultaneous observations by direct sunlight and zenith light on 16.3.1956 showed time difference of 2 hrs in phase. *Subject Headings:* **1. Ozone variations 2. Weissenau, ermany.**—*C.E.P.B.*

ATMOSPHERIC POLLUTION

See also: **Dust bibliogs.** (Martin), 9.1–24; **Atmospheric pollution bibliog.** (Cincinnati Univ.), 9.1–76.

9.1–162 551.510.42:551.575.1:581.1

Bobrov, Ruth Ann (*Univ. of Calif., L. A.*), **Use of plants as biological indicators of smog in the air of Los Angeles County.** *Science*, 121(3145):510–511, April 8, 1955. fig., 15 refs. **DWB**—Smog damage to crops and other plants has been studied since 1947 in the Los Angeles area. It is shown that symptoms of smog damage differ from that due to frost, ozone, SO_2, HF, fungus or insects. The grass *Poa annua* which is common in the Los Angeles region, is an especially good indicator of smog damage. *Subject Headings:* **1. Smog damage to plants 2. Los Angeles, Calif.**—*M.R.*

9.1–163 551.510.42:551.46

†*Bruevich, S. B. and Gudkov, M. P., **Atmosfernaia pyl' nad Kaspiiskim morem.** [Atmospheric dust over the Caspian Sea.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geograf.*, No. 4:18–28, July/Aug. **1954.** table, 33 refs. **DLC**—After having pointed out the important role of eolian deposits in the formation of marine sediments and presented a review of Soviet and foreign literature on the subject, the author discusses the results of investigations of eolian deposits collected on the branches of willow trees growing on sandbanks of the Volga delta (Caspian Sea) after the settlement of dust in the months of April 1950 and 1951. The total amount of eolian material deposited during the several days of the storms was correspondingly 115 and 3 g/m². For the first case (April 1950) this amounted to approximately 30% of the total of all sediments from rivers, ice and eolian sources deposited on the central portion of the Black Sea during a whole year and twenty times more than the quantity of material deposited in the course of a year in the open oceans. The chemical composition of the material is similar to the material deposited in the Atlantic Ocean. *Subject Headings:* **1. Dust deposition 2. Eolian dust 3. Marine sediments 4. Caspian Sea.**—*A.M.P.*

9.1–164 551.510.42

DallaValle, J. M. (*Georgia Inst. of Tech., Atlanta*), **Methods of control of atmospheric pollution.** *Air Conditioning, Heating and Ventilating*, N. Y., 53(9):75–78, Sept. **1956. DLC**—A great deal of time and money has been spent in recent years in making surveys of meteorological conditions and of pollution concentrations in urban areas but little has been done to reduce pollution. The author believes the time has now come to start doing something about the pollution itself before it reaches the point where cities become uninhabitable. Stacks and reduction of soot and large particles do not appreciably reduce the menace. At least two billion dollars will be spent in the next 10 years in control of pollution but this control will not reduce noxious gases at source (e.g., automobile exhaust fumes and radioactive wastes). Need for research on control of chemical vapors and mists, fine particles, etc., is stressed. *Subject Heading:* **1. Atmospheric pollution control.**—*M.R.*

9.1–165 551.510.42:581.

Haagen-Smit, A. J.; Darley, Ellis F.; Zaitlin, Milton; Hull, Herbert and Noble, Wilfred, **Investigation on injury to plants from air pollution in the Los Angeles Area.** *Plant Physiology*, Lancaster, Pa., 27(1):18–34, Jan. **1952.** 3 figs., 4 tables, 12 refs. Abstracted from reprint. Typed in at head of page: *Los Angeles County, Calif. Air Pollution Control District, Publication* No. 28. **DWB**—Laboratory research under controlled conditions made on test plants with an apparatus for dispensing fumigants at a slow and constant rate. Tables summarize the experimental results for five kinds of plants, testing a great number of fumigants. *Subject Headings:* **1. Atmospheric pollution 2. Plant injuries 3. Los Angeles, Calif.**—*A.A.*

9.1–166 551.510.42:628.5

†Hewson, Edgar Wendell (*Mass. Inst. of Tech.*), **Meteorological aspects of atmospheric pollution.** *U. S. Technical Conference on Air Pollution, Wash., D. C.*, 1950, *Air Pollution* Pub. **1950.** p. 775–786. 2 figs., 33 refs., 8 eqs. **DLC**—The author presents equations describing the concentration of contaminants in the atmosphere in the case of pollution from a surface point source and elevated point source and reviews some of the attempts to expres

concentration of contaminant from a surface line source and elevated area source and the general behavior of smoke from an elevated source. The influence of special factors modifying the general behavior of effluents such as the diurnal variation of turbulence, the presence of an inversion above the smoke plume, deposition on ground, coagulation of smoke particles and topography are discussed. The dependence and behavior of the surface distribution of the contaminants from multiple sources upon wind speed, rain stability and topography is illustrated by studies made in Leicester (Eng.). The influence of pollution upon rainfall and fog are considered and methods for minimizing pollution by measuring stack heights and stock temperature, varying emission with meteorological conditions, the methods used by the Trail smelter in British Columbia, the Brookhaven National Laboratory, Los Angeles County, and Donora are summarized. *Subject Headings:* **1. Atmospheric pollution 2. Stack effluents 3. Turbulence effects.**—*I.L.D.*

9.1–167 551.510.42:691.2

Oxford in decay: an appeal and its moral. *Smokeless Air*, 103:26–28, Autumn **1957.** 2 photos. **DWB**—An appeal booklet asks for £2,090,000 to repair buildings crumbling away, mainly from the action of SO_2 on Headington freestone. But no provision is made to stop decay in the future. Oxford should be a smokeless city. *Subject Headings:* **1. Atmospheric pollution effects 2. Buildings 3. Oxford, Eng.**—*C.E.P.B.*

9.1–168 551.510.42

*Renzetti, N. A., **Analysis of air near heavy traffic arteries.** *Air Pollution Foundation, Los Angeles, Calif., Report*, No. 16, Dec. **1956.** 28 p. 9 figs. (incl. photos), 9 tables, 5 refs. **DWB**—The hydrocarbon CO and CO_2 concentrations found at 6–9 a.m. from Sept. 4 to Oct. 2, 1956, in samples of air obtained at 5 ft level above the ground and 60–75 ft from main traffic arteries in and around Los Angeles, are tabulated, shown graphically and discussed. Great variation is shown in CO (4–93 ppm), CO_2 (0.05 to 0.14%) and hexane (0.25 to 23 ppm). Details of the inversion height wind speed oxident (PPHM) and eye irritation (scale 0–55) values, location of sampling points, method of analysis and equipment (illustrated) are included. *Subject Headings:* **1. Air pollution near highways 2. Automobile exhaust pollution 3. Inversion data 4. CO_2 in surface air 5. CO in surface air 6. Hydrocarbons in air 7. Los Angeles, Calif.**—*M.R.*

9.1–169 551.510.42:628.511

Stairmand, C. J., **The prevention of grit and dust emission. Some technical aspects.** *Smokeless Air*, 103:51–60, Autumn **1957.** 6 figs., 5 tables. **DWB**—Pollution is due to grit deposits, dust emissions and the dark appearance of the plume as it leaves the stack. Four types of centrifugal collectors for gross dust are illustrated: scroll, high throughput cyclone, high efficiency cyclone and tubular or multicyclone. Simplest (scroll) type would reduce dust deposition from 1560 to 7 tons/sq mi/month, no more than seaside resorts. Smaller particles which obscure sunlight are more difficult to deal with. These form nuclei for fog particles. The multicyclone reduces "blackness" by 65%. Design of stack in relation to surrounding buildings is important. Finally, methods of measuring emission are described. *Subject Heading:* **1. Dust prevention.**—*C.E.P.B.*

9.1–170 551.510.42:621.18

Die Verunreinigung der Luft, II, Messung and Ausmass der Immissionen. [Atmospheric pollution, Pt. 2, Measurement and scale of injection.] *Umschau*, 57(14):435–438, July 15, **1957.** 10 figs., 4 tables, 2 refs. **III. Reinigung der Industrieabgase.** [Pt. 3, Cleaning industrial waste gases.] *Ibid.*, 57(16):486–489, Aug. 15, **1957.** 5 figs., 2 tables. **DLC**—In Pt. 2 methods of measurement of sulfur compounds and other gases and smoke are briefly described. Influence of domestic chimneys is emphasized. Effect of wind is shown by a series of maps of SO_2 concentration in the northern Ruhr. Chimney height is important at distances up to 4 km. Pt. 3 deals with the separation and burning of fuel dust in the smoke. Three types of filter are described: the cyclone, the multicell and the horizontal electrofilter. No attempt is made to get rid of SO_2. (For Pt. 1, *see* 8.8–95, Aug. 1957, *MAB.*) *Subject Headings:* **1. Atmospheric pollution control 2. Germany.**—*C.E.P.B.*

STRUCTURE OF THE ATMOSPHERE

See also: **Heat balance of troposphere** (Korb et al.), 9.1–23; **Atmos. stratification** (Korejs), 9.1–150.

9.1–171 551.510.53

†Paetzold, Hans-Karl, **Die Meteorologie der Stratosphäre.** [Meteorology of the stratosphere.] *Germany. Deutscher Wetterdienst, Berichte,* 4(22):43–54, **1956.** 17 figs., 3 tables, 61 refs., eqs. **DWB, DLC.** English trans. by Rudolf Loeser and James Gouch, Jr. issued by the American Meteorological Society under Contract AF 19(604)-1936, June **1957.** 41 p. Includes tables and figs.—After briefly summarizing the uniform, specific meteorological characteristics of the stratosphere, the author presents a comprehensive discussion of methods of stratospheric investigation including abnormal sound propagation, meteor observations, search light rays, aeroplanes, balloons and rockets; the composition of the stratosphere including the distribution of the atmospheric gases in the stratosphere, of ozone and of water vapor; transport processes in the stratosphere as indicated by O_3 and H_2O traces; radiation balance; temperature distribution and variations, irregular periodic oscillations of temperature, annual variation of temperature; stratospheric winds and solar influences upon weather. *Subject Headings:* **1. Stratospheric structure 2. Stratospheric temperatures 3. Stratospheric winds 4. Stratospheric research.**—*I.L.D.*

9.1–172 551.510.534:546.172.5

Release of energy from the atmosphere at high altitudes. *Current Science,* Bangalore, 25(4):130, April **1956. DLC, DWB**—Nitric oxide released from rockets at a height of 60 mi over New Mexico was found to give off a flood of light which grew in size to 4 times the diameter of the moon, as observed from the earth. The light spread to a diameter of 3 mi before dimming. Chemical action observed in laboratory may be involved in this case—the nitric oxide acting to bring together two dissociated oxygen atoms to form O_2 and a release of stored energy—which again is acted on by sunlight to dissociate and recombine giving a continuous emission of light under favorable conditions and even providing a supply of energy for rocket propulsion. *Subject Headings:* **1. Nitric oxide action in upper atmosphere 2. Oxygen recombination 3. Artificial illumination in ionosphere 4. Rocket explosion.**—*M.R.*

UPPER ATMOSPHERE—IONOSPHERE

See also: **Rockets in ionosphere research** (Burgess), 9.1–10; **Ionos. structure** (Chestnov), 9.1–13; **High altitude weather affecting background radiation** (Martin), 9.1–24; **Ionogram atlas** (Wright, Knecht), 9.1–34; **Ionospheric data yearbooks** (Little), 9.1–62; **Satellite determination of ionospheric structure** (Berning), 9.1–91; **Satellite propagation experiment** (Hartman, Haviland), 9.1–93; **Satellite investigation of ionosphere** (Hok et al.), 9.1–95; **Ozone radiosonde** (Kulcke, Paetzold), 9.1–148; **Ionospheric temp. effects** (Akasofu), 9.1–215; **Stratospheric temp.** (Penndorf), 9.1–217; **Stratosphere temp.** (Vercelli), 9.1–218; **Ozone transport** (Paetzold), 9.1–235.

9.1–173 551.510.535:523.7

Allen, C. W. (*Univ. of London, Observatory*), **Solar sources of the ionospheric regions.** (In: **Solar eclipses and the ionosphere: a symposium . . .** ed. by W. J. G. Beynon, and G. M. Brown. London, Pergamon, **1956.** p. 150–157. 4 tables, 21 refs.) **DWB**—The first question considered asks which parts of the sun emit those radiations that produce the ionosphere. Our information comes mainly from correlations between ionospheric and solar data. For the *E* and *F* radiations there is a quiet component from the whole sun and a component associated with centers of activity. The level of emission is uncertain, but is probably the lower corona. The second question concerns the intensity and spectrum of the radiation. We try to solve this from ionospheric studies, rocket observations, and solar theory, but conclusions reached are still somewhat tentative. *Subject Headings:* **1. Solar-ionospheric relationships 2. Ionospheric origin 3. Solar radiation.**—*Author's abstract.*

9.1–174 551.510.535:551.594.7:551.594.12

Banerjee, S. S. and Surange, P. G. (*Engr. Coll., Banaras Hindu Univ., Banaras*), **Scattering of radio waves and the horizontal gradient of ionisation in the ionosphere.** *Science and Culture*, Calcutta, 21(12):750–753, June **1956.** 3 figs., 2 tables, 4 refs., 4 eqs. **DLC**—Besides the normal horizontal gradients of ionization in the ionosphere there are shown to be short regions with sharp horizontal gradients which modify the propagation of radio waves so as to produce non-linear P'f curves for backscatter. A uniform ionosphere (linear) curve and a non-uniform (non-linear) case are shown graphically, based on pulse signals on Feb. 10 and Feb. 15, 1955, respectively (at Banaras, India). Data are also presented in tables. (For 1953 data, *see* 5.6–286, June 1954, *MAB*.) *Subject Headings:* **1. Ionization gradients in ionosphere 2. Ionospheric radio wave scattering.**—*M.R.*

9.1–175 551.510.535:551.521.63:523.75

Ellison, M. A. (*Royal Obs., Edinburgh*), **Sudden ionospheric disturbances in relation to solar flare radiations.** (In: **Solar eclipses and the ionosphere: a symposium . . .** ed. by W. J. G. Beynon and G. M. Brown. London, Pergamon, **1956.** p. 180–183. 6 refs.) **DWB**—A solar flare emits a burst of ultra-violet radiation which has immediate repercussions in the *D* and lower *E* regions. The operative wavelengths are still uncertain; but Lα (1216 Å) radiation at the higher levels and X-rays ($\sim$5 Å) at lower levels seem probable. Comparisons have been made between the development curves of the S.I.D.'s and of the Hα radiation of the flares which caused them. On the assumption that the ultraviolet follows the same variation with times as the Hα light, some deductions can be made about the relaxation times and the maximum ionization at various levels. *Subject Headings:* **1. Sudden ionospheric disturbances 2. Ultraviolet radiation 3. Solar flares.**—*Author's abstract.*

9.1–176 551.510.535:551.594.13:551.507.362

Haycock, Obed C., **Experimental plan and instrumentation for the determination of the electron density in the ionosphere.** Utah. Univ. Upper Air Research Laboratories, Contract AF 19(604)-384, Scientific Report, No. 1 (and) Final Report on the Contract, June 1, 1952–April 30, 1957, pub. May 21, **1957.** 129 p. 37 figs., foot-refs.—A complete summarization of the essential results of a 10 year study of the electron density of the ionosphere (E layer to 37 km) by pulse transmissions at or slightly above the critical frequency (F_0) of the layer penetrated by the sounding rocket, compared with the non-delayed signal at a frequency so high it would not be affected by the ionization of the layer in question. Both upward and downward transmissions were used. Equipment was automatic but reduction of data was tedious. Plan of experiment, of circuits, changes in plans as time passed, details of operation and results are presented graphically and described. Electron density increases markedly from 85 km (0) to 2×10^{11} per m^3 at 115 and 130 km. *Subject Headings:* **1. Ionospheric sounding by rockets 2. Rocket soundings 3. Ionospheric electron density.**—*M.R.*

9.1–177 551.510.535

†*Smith, Ernest Ketcham, Jr., **Worldwide occurrence of sporadic E.** *U. S. National Bureau of Standards, Circular*, No. 582, March 15, **1957.** 278 p. numerous figs. and tables, 115 refs. **DLC** (QC100.U555)—This monograph contains a thorough review of the literature and a discussion of the structure, energy sources, physical state and definition of E_s; of data obtained by vertical incidence (HF) and oblique incidence (VHF) sounding. The limiting frequency is (>) 5 mc. The appearance of various types of E_s (Huancayo, auroral, sequential, blanketing, stratified, transparent, etc.), the major E_s zones (equatorial, temperate, auroral), the geographical variations, magnetic activity relations, reception at >400 miles, field strength data, relation of vertical to oblique incidence data and sources of energy for E_s (solar corpuscles, meteors, thunderstorms, winds and turbulence) are treated. Meteors provide one, but not a major, source of E_s. *Subject Heading:* **1. Sporadic E layer (E_s).**—*M.R.*

MECHANICS AND THERMODYNAMICS OF THE ATMOSPHERE

See also: **Vertical motion and kinetic energy release in hurricanes** (Palmen), 9.1–27.

9.1–178 551.511:551.576.11

Wachter, Heinz, **Zum Wirkungsgrad atmosphärischer Wärmeumwandlungen.** [On the efficiency of heat transformations in the atmosphere.] *Annalen der Meteorologie*, 8(1/2):16–21, **1957.** 4 figs., 3 tables, 6 refs. **DWB**—A discussion of part of water vapor in cumulus and cumulonimbus processes. The atmosphere is not a simple heat machine but a 2-substance power machine using water vapor and air. Various diagrams and tables of CuNb cells are presented, especially BRAHAM's. *Subject Headings:* **1. Thermodynamics of the atmosphere 2. Cumulus cloud formation 3. Cumulonimbus development. I. R. R. Braham, Jr.**—*C.E.P.B.*

9.1–179 551.511.33

Budyko, M. I. (*Central Geophys. Obs., Leningrad*), **Heat balance of the surface of the earth.** *World Meteorological Organization. Commission for Climatology, 2nd, Wash., D. C., Jan. 1957, Papers*, CC1-II/SP.3, Jan. 19, **1957.** 13 p. tables. **DWB** (MO6 W927cm CC1:1957)—The development of actinometric networks and other measurements pertaining to the heat balance of the earth's surface are reviewed, with particular attention to work done in the U.S.S.R. The **Atlas of thermal balance of the earth** prepared at the main Geophysical Observatory of the U.S.S.R. and data used in preparing it are briefly discussed. Two tables showing average annual values of the heat and water balances of each continent and ocean are presented. (For more information on the **Atlas,** *see* 8.5–19 and 20, May 1957, *MAB*.) *Subject Headings:* **1. Heat balance of earth's surface 2. Heat balance atlases.**—*G.T.*

9.1–180 551.511.6

Crane, Harold L. and Chilton, Robert G., **Measurements of atmospheric turbulence over a wide range of wavelength for one meteorological condition.** *U. S. National Advisory Committee for Aeronautics, Technical Note*, 3702, June **1956.** 18 p. 9 figs., 6 refs., 4 eqs. **DWB, DLC**—A power spectrum of gust vertical velocity over a wide range of wavelengths, 10 ft to 60,000 ft, has been obtained by a simultaneous set of measurements in flight. The method used, which had the advantage of not involving airplane transfer functions, proved to be practicable. The data were obtained on film records and the power spectrum was calculated by digital methods. *Subject Headings:* **1. Gust structure 2. Gust frequency 3. Turbulence.**—*Authors' abstract.*

9.1–181 551.511.6

Dexter, R. V. and Scorer, R. S., **Vorticity.** *Weather*, 12(9):296–297, Sept. **1957. DWB**—DEXTER questions SCORER's statement (*Weather*, 12(3):72–84, March **1957**; *see* 8.7–172, July 1957, *MAB*) that only the vertical component of vorticity is conserved when air changes its latitude in long waves. SCORER replies that in our atmosphere complete rotation about nearly horizontal axes cannot normally occur. *Subject Heading:* **1. Vorticity.**—*C.E.P.B.*

9.1–182 551.511.6:551.509.313

Starr, Victor P. and Gates, W. Lawrence, **Investigation of the integrated momentum vorticity equation.** (In: Massachusetts Institute of Technology. Dept. of Meteorology, Contract AF 19(122)-153, Studies of the Atmospheric General Circulation, **Final Report, Pt. 1,** May 31, 1954. p. 285–295. 4 figs., 7 refs., 15 eqs.)—Basic equation derived with wide applicability and very few assumptions, independent of thermal processes, distribution of vertical motion, and including effects of irregular terrain. An approximate form, neglecting secondary effects can be used for the atmosphere. A numerical example is studied for the field 30–50N and 70–125W, analyzing barotropic and baroclinic effects. *Subject Headings:* **1. Vorticity equations 2. Numerical forecasting 3. United States.**—*A.A.*

GENERAL CIRCULATION

See also: **Project Rawijet** (Plagge, Smith), 9.1–230.

9.1–183 551.513:551.524.7:551.557(266)

Hoyle, H. D., **The subtropical jet stream of the eastern North Pacific Ocean in January and April 1952.** *Great Britain. Meteorological Office, Professional Notes*, 8(122), **1957.** 20 p. 15 figs., 9 refs. **DWB**—Daily maps for 10–50°N, 120–180°E were drawn for 500, 300, 200 and 150 mb with cross sections once or more a day. Daily charts show cores of jet streams in April and July. Three types appear in April and 3 in Jan., 4 altogether. Two jet stream cores are often present, one at 300 mb associated with polar front, the other 1000 mi to south and at 200 mb. Vertical and horizontal temperature distribution and other daily parameters are plotted, and contours (including surface isobars) mapped for different types. *Subject Headings:* **1. Pacific jet stream 2. North Pacific.**—*C.E.P.B.*

9.1–184 551.513:551.524.35

Krueger, Arthur F. (*U. S. W. B., Wash., D. C.*), **The weather and circulation of September 1955.** *Monthly Weather Review*, 83(9):206–209, Sept. **1955.** 4 figs., table, 4 refs. **DWB**—The author discusses the variation of temperature anomalies which underwent a complete reversal during Sept. 1955. The circulation changes involved a "readjustment in the long wave pattern over North America, the distribution of precipitation, hurricane activity and circulation features over the Northern Hemisphere in general." *Subject Headings:* **1. General circulation 2. Temperature anomalies 3. Northern Hemisphere.**—*I.L.D.*

9.1–185 551.513

Mashkovich, S. A., **O sezonnykh izmeneniiaky struĭnykh techeniĭ.** [Seasonal jet stream variations.] *Meteorologiia i Gidrologiia*, Leningrad, No. 6:14–21, June **1956.** 3 figs., 4 refs., 22 eqs. **DWB, DLC**—An attempt is made to establish theoretically the seasonal variation of the zonal circulation of the atmosphere. Formulas are derived for calculating the mean seasonal distribution and variation of zonal velocities and also the annual variations of zonal temperature. These formulas are used to calculate the annual variations of the zonal circulation at an elevation of 10 km for both high and low latitudes, and the results are shown on graphs. *Subject Headings:* **1. Seasonal zonal circulation variations 2. Jet stream.**—*I.L.D.*

9.1–186 551.513

*Trenkle, H. (*Frankfurt a.M.*), **Approximation values of the zonal velocity in the Atlantic-European sector for the period of 1881–1955.** Germany. Deutscher Wetterdienst, Contract AF 61(514)-646-C, Scientific Report No. 2, May **1956.** 13 p. 2 figs., 7 tables, 4 refs., eqs.—The zonal component of wind in the Atlantic-European Sector (U 120) shows in 500 mb in the zone of 50°–60°N for the period of time of 1948–1955 in case of a means and frequency comparison characteristic differences at different groups of "Grosswetterlagen," i.e., the European "Grosswetterlagen" can be employed in the statistical sense for the characterization of U 120. This, however, brings us to the idea of calculating approximate monthly means of U 120 for the period since the year 1881 to be obtained from the means of U 120 computed for the different months for different groups of "Grosswetterlagen" based on the distribution of the "Grosswetterlagen" and on the yearly development of the zonal velocity. The test effected for the period 1948–1955 was a positive one above all for the months of Oct. and March containing sufficiently frequent data, so that taking into account an error source of approximately 10% it might be possible to establish a catalogue of U 120 for these months for the period since the year 1881. *Subject Headings:* **1. Zonal circulation 2. Zonal component of wind.**—*Author's abstract.*

9.1–187 551.513.2:551.557.5

Palomares Casado, Manuel, **Efectos de la corriente aerea en chorro sobre las capas atmosféricas inferiores.** [Effects of the jet stream on the lower atmospheric layers.] *Revista de Geofisica*, Madrid, 15(58):167–172, April/June **1956.** 2 figs., 7 eqs. Spanish and English summaries p. 167. **DWB**—A theoretical study of the effect of the jet stream on the secondary circulation at lower levels. The special cases of a sinusoidal jet stream and of variations in latitude of the jet are considered. *Subject Headings:* **1. Jet stream effects 2. Low level jet stream.**—*M.R.*

9.1–188 551.513.2:551.557

Sawyer, J. S., **Jet stream features of the earth's atmosphere.** *Weather*, 12(11):333–344, Nov. 1957. 10 figs., 15 refs. **DWB**—At University of Chicago in 1946 "jet stream" was discovered in upper westerlies. Since then 2 or 3 distinct jet streams have been discovered. These are illustrated by 500, 300 and 200 mb circumpolar charts and by vertical cross sections for Dec. 19, 1953. The jet stream lies above a region where temperature decreases rapidly northward in a sloping frontal zone. Maximum occurs a little below tropopause. Local or "confluence" jet streams are described, including vertical circulation and horizontal wind shear. Complete circumpolar jets are explained by transport of momentum and vorticity by lateral mixing in depressions and anticyclones. The subtropical jet in lat. 20–30°N is attributed to a slow northward drift of air from the equator. *Subject Heading:* **1. Jet stream.** —*C.E.P.B.*

ATMOSPHERIC DISTURBANCES

See also: **Tropical cyclone symposium**, 9.1–4; **Vertical motion and kinetic energy release in hurricanes** (Palmén), 9.1–27; **Hurricane analog guide** (U. S. W. B.), 9.1–32; **Frontal passage effects on mortality** (Takáts, Somogyi), 9.1–117; **Tornado composite charts** (U. S. W. B.), 9.1–156.

9.1–189 551.515.13

Berson, F. A. (*Div. of Met. Physics, C.S.I.R.O., Australia*), **Some statistical aspects of tropical cyclone steering.** (In: Tropical Cyclone Symposium, Brisbane, Dec. 1956, **Proceedings,** Pub. Dec. **1956.** p. 325–341. 5 figs., 3 tables, 13 refs. **DWB**—From daily charts over a 10-year period, monthly normals for the months Dec. to March of position, latitudinal extent and strength (mean zonal easterly index) of the trade winds at 105°, 130° and 160°E long. were determined; also the northern limit and strength of the westerlies to poleward, at the 500 mb level, at 120° and 150°E. These were related to the monthly frequency of tropical cyclones affecting eastern and western parts of Australia. Some aspects of behavior of the storms prior to recurvature were then studied, using average departures from normal of the basic currents. A bimodal frequency distribution of the departures is evident. It is interpreted as the reflection of two broad categories of cyclones, differing in degree of westward steering and in intensity. These differences are found to depend on the position and strength of the low level easterlies as well as the overlying westerlies. There appear to be certain differences between eastern and western cyclones in this respect, presumably due to different structure of the trades at eastern and western ends of the subtropical anticyclones. *Subject Headings:* **1. Tropical cyclone steering 2. Easterly index 3. Australia.**—*Author's abstract.*

9.1–190 551.515.13(73)

Hosler, C. L. and Gamage, L. A. (*Dept. of Met., College of Mineral Indust., Penn. State Univ.*), **Cyclone frequencies in the United States for the period 1905–1954.** *Monthly Weather Review*, Wash., D. C., 84(11):388–390, Nov. **1956.** 2 figs., ref. **DWB, DLC**—Data are based on monthly cyclone tracks published in the *Monthly Weather Review*, 1905–1954. Annual number of cyclones counted in all 5° lat. long. squares shows marked year to year variability but no trends or systematic behavior. Charts for each month for U. S. show maximum of >4.0 in Great Lakes and New England area in Nov.–Jan. and in the Midwest in March. Minimum of <0.5 occur in the south and west from May–Oct. (Aug. shows the largest area of <0.5 storm). *Subject Headings:* **1. Cyclone frequencies, United States 2. United States.** —*M.R.*

9.1–191 551.515.2(72)

*Contreras Arias, Alfonso, **Los dos aspectos del efecto de la actividad ciclónica tropical sobre el territorio mexicano.** [Two aspects of the effect of tropical cyclonic activity over Mexican territory.] *Boletín de Estudios Especiales*, Mexico City, 6(68):137–168, Aug. 25, **1956.** photos, 7 figs., tables. Abstracted from separated sheets. **DWB** (M15.2 C764d)—A thorough analysis of the hurricanes "Gladys," "Hilda" and "Janet" of Sept. 1955 and of the floods which devastated the east coast of Mexico in Sept. and early Oct. as a result of the long continued heavy rains. A review of salient data from previous hurricanes and a description

thereof, is included. The course of the flood at Tampico, which rose to 20 ft on Oct. 6, is vividly portrayed in a graph and in photographs. Economic and agricultural losses are analyzed. A relation between amount of precip., which is closely related to hurricanes, and crop yield is shown. *Subject Headings:* **1. Hurricane damage in Mexico 2. Hurricane statistics 3. Hurricanes, Mexico (1955) 4. Tampico, Mexico 5. Mexico.**—*M.R.*

9.1–192 551.515.3

Canada. Meteorological Division, **Tornadoes.** [Pub. 1954?] 1 p. diagrs.—Leaflet for popular dissemination of elementary knowledge on physical nature, time of occurrence, size, force and appearance of tornadoes, on the damage they cause and on best safety measures. Diagrams show "infant," "adult," and "dying tornado." *Subject Headings:* **1. Tornadoes 2. Popular meteorology.**—*G.T.*

9.1–193 551.515.3:551.509.52

Chase, Donald V., **Twister time.** *South Bend Tribune Magazine*, May 1, **1955.** p. 6. photo. **DWB**—Statistics and facts about tornadoes, especially in Indiana, and hints for safety. Measures when warnings are issued for the area accompany a large picture of the Toledo, Ohio tornado of June 1953. *Subject Headings:* **1. Tornado danger 2. Indiana.**—*M.R.*

9.1–194 551.515.3(766)

†Dickson, Don R., **Tornado damage survey project of the Research Foundation, Oklahoma A. and M. College.** Oklahoma. Agricultural and Mechanical College. Research Foundation, Contract Cwb 8697 (Unnumbered Report), March **1957.** 18 p. appendices. figs., 316 refs. **DWB** (M15.3 O41t)—A detailed study and report on the damage and characteristics of the one major tornado striking Oklahoma in 1956—the Drumright, Okla. storm of April 2, 1956. The funnel was 1000 ft long, 20–30 ft to 300 ft wide, and moved at about 75–80 mph. It was on the tail of a thunderhead (clearing occurred immediately). Drawings and diagrams show details of destructive forces calculated for several structures. *Subject Headings:* **1. Tornado damage surveys 2. Tornado, Drumright, Okla. (April 2, 1956) 3. Drumright, Okla.**—*M.R.*

9.1–195 551.515.3(42)

Lamb, H. H., **Tornadoes in England May 21, 1950.** *Great Britain. Meteorological Office, Geophysical Memoirs*, No. 99, **1957.** 38 p. 16 figs., 5 photos, 2 tables, 19 refs. **DWB**—Three tornadoes formed in Chiltern Hills in afternoon of May 21 and moved NE; damage £50,000, mainly by wind shear. Tracks are mapped, one of 65 mi. Flooding was extensive and hailstones reached $6\frac{1}{2}''$ circumference. Effects are described as suction, lifting, twisting and battering. Accompanying weather phenomena are described—sferics and lightning, hail, rainfall and flooding, anemograms and barograms. A reconstructed pressure curve shows a fall of 30 mb within 20 yds of center. Wind velocity distribution is discussed but there is not enough evidence. Synoptic situation is mapped and vertical sections drawn. Geographical and monthly distribution of destructive tornadoes in British Isles is discussed; maximum over lower Thames valley and Chiltern Hills is 0.5/10,000 km²/yr. Causes of tornado development are discussed and a list of 20 destructive tornadoes (1558–1839) is given. *Subject Headings:* **1. Tornadoes 2. England.**—*C.E.P.B.*

9.1–196 551.515.3(424)

Myatt, J. J., **Waterspout on the River Severn near Shrewsbury.** *Meteorological Magazine*, London, 86(1023):279–280, Sept. **1957. DWB**—April 19, 1957, a waterspout crossed the river (60–70 yds) as a column of water 1–3 ft diameter and 1 ft tall, with spray to 8 ft. *Subject Headings:* **1. Waterspouts 2. Shrewsbury, Eng.**—*C.E.P.B.*

9.1–197 551.515.4(44)

Chaussard, A., **Les orages du 27 août 1955 sur le Lyonnais.** [Thunderstorms on Aug. 27, 1955 in the Lyons region.] *La Météorologie*, Paris, No. 42:121–126, April/June **1956.** 6 figs., table, 3 refs. **DWB**—A series of unusually severe thunderstorms caused extremely heavy damage in the Lyons region in the afternoon of Aug. 27, 1955. Measurements con-

nected with one of the storms which passed over a weather station, and data on the general synoptic situation are presented. The surface temperature of 14°C measured at Lyons was 4°C below the dew point temperature and was also lower than the lowest possible pseudo-potential temperature aloft. This appears to confirm the presence of downdraft areas inside thunderclouds, the descending air being cooled by evaporating water drops and contact with hailstones. *Subject Headings:* **1. Thunderstorms 2. Synoptic conditions for storms 3. Temperature in thunderstorms 4. Lyons, France.**—*G.T.*

9.1–198 551.515.73(931) 551.577.34(931)

De Lisle, J. F., **Fluctuations of seasonal pressure patterns in the vicinity of New Zealand.** *New Zealand Journal of Science and Technology, Sec. B.*, 38(5):400–415, March **1957.** 9 figs., table, 7 refs., 11 eqs. **DLC, DGS.** Also issued as reprint by *New Zealand. Meteorological Service, Meteorological Office Note*, No. 44, **1957. DWB?**—A filter analysis of a 61-year seasonal rainfall series from the west coast of the South Island of New Zealand shows that the largest-amplitude components are of short period ($\leq$5 years) but that in spring a large-amplitude, long-period (>20 years) component exists. It is shown that this is largely dependent on the long-period fluctuation of a pressure difference index and due to a long-period movement (found also in winter) of the seasonal mean pressure pattern in the vicinity of New Zealand. In these seasons the mean subtropical anticyclone lies entirely to the north of New Zealand and the data imply an irregular southward movement of the seasonal mean pressure patterns from about 1918 to the mid-1930's. *Subject Headings:* **1. Seasonal rainfall variations 2. Pressure patterns 3. Subtropical anticyclones 4. New Zealand.**—*Author's abstract.*

RADIATION AND TEMPERATURE

RADIATION

See also: **Radiation diffusion by droplets** (Bricard), 9.1–19; **Heat balance of troposphere** (Korb et al.), 9.1–23; **High altitude weather effects on radiation** (Martin), 9.1–24; **Computation of global radiation** (Ångström), 9.1–119; **SID-solar flare relationships** (Ellison), 9.1–175; **Spectral properties of aerosols** (Volz), 9.1–248; **Snow cooling through surface radiation** (Takahashi et al.), 9.1–262.

9.1–199 551.521:551.573

Michalowsky, Johannes, **Strahlungsbilanz und Landesverdunstung.** [Radiation balance and evaporation rate.] *Annalen der Meteorologie*, 8(1/2):7–10, **1957.** fig., 2 tables, 9 refs. English summary p. 10. **DWB**—At Quickborn correlation between daily radiation balance at earth's surface and evaporation, April–Oct. 1954, ranged from 0.76 to 0.95. By contrast correlation between saturation deficit and evaporation was only 0.04–0.51. No correlation could be found between wind velocity and evaporation. On rainy days relation between sensible and latent heat was negligible, and nearly all radiation balance was used for evaporation. On rainless days nearly half sensible heat went to warm the atmosphere. This result cannot be applied to the sea where heat transfer is governed by vertical and horizontal temperature gradients. *Subject Headings:* **1. Radiation balance 2. Evaporation 3. Quickborn, Germany.**—*C.E.P.B.*

9.1–200 551.521

*Pivovarova, Z. I., **Radiatsionnyi balans deiatel'noi poverkhnosti i metodika ego obrabotki.** [Radiation balance of the active layer and method of analysis.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy*, 61(123):22–69, **1956.** 4 figs., 12 tables, 10 refs. **DWB**—The results of extensive observations of radiation balance and albedo at 18 stations of the Soviet Union in the period between 1951–1955, and methods used for processing the data are presented in a number of tables and graphs and discussed. Tables showing the mean monthly intensity of radiation balance (6 daily measurements) at the 18 stations, and the daily balance on the 15th of each month (in cal/cm²/day) for 1953–1955 are included. *Subject Headings:* **1. Radiation balance 2. Albedo data 3. U.S.S.R.**—*A.M.P.*

9.1–201 551.521

Sakali, L. I., **Rol' iasnoĭ pogody v formirovanii radiatsionnogo rezhima g. Odessy.** [Role of clear weather in the radiation regime of Odessa.] *Meteorologiia i Gidrologiia*, No. 7:22–23, July **1956.** 2 tables. **DWB, DLC**—The investigations of the radiation regime in Odessa is based upon an analysis of effective illumination for 1951–1952 and reflected radiation for 1950 and 1951. Data are given on the monthly heat totals for clear days from direct and diffuse radiation and radiation on a horizontal surface and monthly totals of heat and totals for clear days from effective radiation. On the average, the radiational balance on clear days is 40–50% greater than that on cloudy days because of the value of direct radiation on clear days. Hence the heat totals from radiational balance are on the average for the year 25–30% of the monthly totals. *Subject Headings:* **1. Radiation 2. Radiation balance 3. Cloud effects on radiation 4. Odessa, U.S.S.R.**—*I.L.D.*

9.1–202 551.521.1

*Dirmhirn, Inge, **Über Strahlungsmessungen auf einer Reise durch Norwegen.** [Radiation measurements on a trip through Norway.] *Akademie der Wissenschaften, Vienna, Math-Naturwiss. Klasse, Abt. II*, 164(5/7):143–160, **1955.** 2 figs., 7 tables, 16 refs. **DWB, DLC**—In order to compare radiation conditions in the Alps with those in other latitudes, the author made a trip to northern Norway in mid-June to early Aug. 1952, and presents and analyzes data on sun and sky radiation received on a normal surface at solar altitudes of 5°, 10° . . . 50°, and at each hour of the day at Tromsö (70°N), Volbu and Spissebu (61°N) in Norway, using a Michelson-Büttner actinometer (No. 852) compared with a Silver disk pyrheliometer (A.P.O. 9) before the trip. The weather was not good for solar radiation measurements. Turbidity factors (after Feussner and Dubois) were calculated for the 3 points as 2.50, 2.59 and 2.37. Sky radiation is treated at considerable length, comparing the author's data with those obtained by other authors for the same and other places in Norway. Multiple reflection between snow and dark grey paper was also measured and studied, and radiation with various degrees of cloudiness. It was found that solar radiation (in Norway) is unusually intense and sky radiation weak, because of the uncontaminated air. Comparison is made between sky radiation intensity with high, middle and low clouds of each cloud amount 1/10 to 10/10, at the 3 locations. *Subject Headings:* **1. Solar radiation 2. Sky radiation 3. Norway.**—*M.R.*

9.1–203 535.33:551.521.326:551.593.55

Sholokhova, E. D. and Frish, M. S., **Svetimost' sumerechnogo neba v oblasti odnogo mikrona.** [Luminescence of the twilight sky in the one micron region.] *Akademiia Nauk SSSR, Doklady*, No. 105(6):1218–1220, Dec. 21, **1955.** 2 figs., table, 9 refs. **DLC**—The author attempts to determine the existence of twilight "flashes" (a series of emitted lines or regions produced by the luminescence of individual layers of the upper atmosphere) in the more distant infrared region near 1μ which has intense lines and fields in the spectrum of luminescence of the night sky. The actual luminescence of the sky in the 1μ region was differentiated from the total radiation diffused at twilight, the ratio of the intensity at 1μ to that at 0.7μ was determined. It was found that in the 1μ region both morning and twilight curves have a distinct maximum, so that the infrared radiation at 1μ has a distant maximum at a definite moment of twilight. In the 700–800 mμ flashes are either lacking or less distinctly expressed. The differences in behavior of these two spectral regions correspond to analogous phenomena observed during the luminescence of the night sky and of solar eclipses. The atmospheric origin of the flashes is indicated by the fact that this maximum obtained at $Z=47^6$ is brighter than that of $Z=0°$, and a solar relationship is indicated since the later is the sunrise the later is the observed maximum. *Subject Headings:* **1. Twilight phenomena 2. Twilight luminescence spectra.**—*I.L.D.*

9.1–204 551.521.61:551.575:551.576

Arnulf, A.; Bricard, J. and Veret, C., **Recherches sur la propagation de la lumière visible et infra-rouge à travers les nuages et le brouillard.** [Studies on the propagation of visible and infrared light through clouds and fog.] *I.U.G.G. Association of Meteorology, Rome, Sept. 1954, Scientific Proceedings.* London, Butterworth, **1956.** p. 62–63. ref. **DWB**—

The physical principles of calculation in absolute values of variation of optical density of a layer of air as a function of wave length in the visible portion of the spectrum (STRATTON and HOUGHTON) and as a function of the low absorption of light by droplets in the infrared region (HOUGHTON and CHALKER) are described briefly. It is found that the selectivity increases with wave length beyond 10μ and the absorption caused by fog becomes almost negligible towards 100 μ. *Subject Headings:* **1. Infrared absorption 2. Infrared radiation through clouds 3. Infrared radiation through fog.**—*I.L.D.*

9.1–205 551.521.61:535.33:551.510.41

Benedict, William S., **Theoretical studies of infrared spectra of atmospheric gases.** Johns Hopkins Univ. Laboratory of Astrophysics and Physical Meteorology. Contract AF 19(604)-1001, Final Report, June 21, **1956.** 66 p. 7 figs., 10 tables, 32 refs., 24 eqs.—Report on studies of the position, intensity and shape of spectral lines of CO_2 and H_2O made for the purpose of ultimate prediction of the transmission of infrared energy under conditions where no direct measurements can be had. The theoretical results are checked against experimental data covering 20 bands (of CO_2). The methods of determining strength, width and shape of spectral lines from infrared laboratory measurements are also treated thoroughly, especially for cases where spectral lines may be determined but the line contours cannot be determined. *Subject Headings:* **1. Infrared spectra 2. Atmospheric gases.**—*M.R.*

9.1–206 551.521.61:551.508.25

*Butler, Clay P. (*Naval Radiological Defence Lab., San Francisco*), **On the exchange of radiant energy between the earth and the sky.** *U. S. Naval Research Lab., NRL Report* 3984, June 11, **1952.** 13 p. 15 figs., table, 6 refs. **DWB**—A specially mounted Perkin-Elmer spectrometer was used for measuring the infrared spectrum of the sky at zenith angles varying from 0° to 85° in an east-west plane. Instrumentation, calibration and method of measurement are described and curves showing the variation of sky radiation with air mass, cloudiness, season, etc. are presented. It is found, among others, that there is no diurnal variation in the energy spectrum of the zenith sky with wavelengths over 3μ and that the transfer of monochromatic radiation between earth and sky is *not* inversely proportional to the square root of the air mass. Attention is called to unidentified emission bands at 11.7 and at 12.7μ found in spectra of the clear sky over Wash., D. C. *Subject Headings:* **1. Infrared spectroscopy 2. Washington, D. C.**—*G.T.*

9.1–207 551.521.61

Feussner, K. (*Berlin, Dahlem*), **Über die effektive Ausstrahlung.** [The effective radiation.] *I.U.G.G. Association of Meteorology, Brussels, 1951, Procès-Verbaux des seances,* pub. Brussels, Dec. **1953.** p. 226–231. eqs. **DWB**—Outline of a comprehensive work, covering long wave radiation processes in the troposphere and stratosphere. The author proposes the equation

$$\Delta = \frac{E}{\sigma T^4} = 10^{-aW^c} = 10^{-be_0^c}$$

Δ—ratio between the effective radiation (E) and the black radiation σT^4; W—precipitable water in cm; e_0—water vapor pressure at the ground in mm Hg. Using FOWLE's data for the absorption in different spectral regions, the following values for the constant involved were found: $a=0.534$, $b=0.456$, $c=0.108$. Comparison between different equations revealed the least range of applicability for BRUNT's equation and the largest range for the new formula. *Subject Headings:* **1. Infrared radiation 2. Effective radiation.**—*A.A.*

9.1–208 551.521.61:546.17

Herman, L. and Herman, R., **Spectre de la molecule d'azote dans l'infrarouge photographique.** [Spectrum of the N_2 molecule in photographic infrared.] *Société Royale des Sciences de Liège, Mémoires, Ser.* 4, 12(1/2):303–304, **1952.** table, 2 refs. **DLC**—The N_2

molecule emits two systems of bands in the near infrared. The first positive system is very intense and often masks other bands in the same spectral region. By reducing the relative intensity of this first positive system it is possible to recognize at least two other systems. Characteristics of these two systems are explained and shown in a table which gives wave lengths of heads of spectral bands. *Subject Headings:* **1. Nitrogen spectra 2. Photographic infrared.**—*M.R.*

9.1–209 551.521.61:551.576.2

Kreitz, Ernst (*Univ. of Frankfurt a.M.*), **Registrierungen der langwelligen Gegenstrahlung in Frankfurt.** [Recording of long wave radiation in Frankfurt.] *Geofisica Pura e Applicata*, 28:292–300, 1954. German and English summaries p. 292. 3 figs., 3 tables, 8 refs. **DWB, DLC**—From March to Oct. 1953, the atmospheric long wave radiation has been recorded in Frankfurt during day and night time. For evaluating the records, no instantaneous values were taken, but the hourly sums, so that the relations found can more generally be used for computations. The atmospheric long wave radiation is almost twice as strong as the short wave radiation from sun and sky on a horizontal plane. The mean measured values of the atmospheric long wave radiation coincide well with FEUSSNER's formula. However, the deviations of the single values are very large. Confirming the results of other authors, it has been found that the atmospheric long wave radiation increases with the second power of the cloudiness, only with low clouds in daytime the increase is approximately linear. Negative values of the effective radiation occur more frequently than expected, but only in the forenoon. So with a dense low cloud cover the flow of heat after sunrise is directed downward. The atmospheric long wave radiation may satisfactorily be computed, if FEUSSNER's formula, mean values of temperature, vapor pressure, cloudiness, and the mentioned cloudiness relation are taken. *Subject Headings:* **1. Infrared radiation 2. Cloudiness effects 3. Feussner's formula 4. Frankfurt, Germany.**—*Author's summary.*

9.1–210 551.521.64

Dorman, L. I. (*Moscow. Inst. for Geomagnetic, Ionospheric and Radio Propagation*), **Vspyshka intensivnosti kosmicheskikh luchei.** [Jump in intensity of cosmic rays.] *Priroda*, Moscow, 45(6):85–87, June 1956. fig. **DLC.** Also summary by D. Radinovíc in *Yugoslavia. Hidrometeorološka Služba, Vesnik*, 5(1/2):53–54, Jan./June 1956. fig. **DWB**—Five graphs show unprecedented increase in cosmic ray intensity at 0330Z (0630 Moscow time) on Feb. 23, 1956, at Moscow, Sverdlovsk, Tiflis, Yakutsk and Cape Shmidt, respectively. The increase was from 100% to 400 or 500% of normal level and was greatest in Moscow and Sverdlovsk (only 100%–200% at the other 3 stations). The asymmetry testifies to the magnetic effects on the incoming stream of hard particles—in Japan it was only $\frac{1}{5}$ that in Moscow. Shower was in connection with a marked chromospheric disturbance on the sun. Several previous events of like nature (1942, 1946 and 1949) are noted but these were exceeded by 5–10 times during the 1956 eruption. *Subject Headings:* **1. Cosmic ray storm—Feb. 23, 1956 2. Solar eruption—Feb. 23, 1956 3. Moscow, U.S.S.R. 4. Sverdlovsk, U.S.S.R. 5. Tiflis, U.S.S.R. 6. Yakutsk, U.S.S.R. 7. Cape Shmidt, U.S.S.R.**—*M.R.*

9.1–211 612.12:551.521.64:551.590.21

Köhler, Udo, **Takata-Reaktion und Wetterfronten.** [Takata reaction and weather fronts.] *Naturwissenschaften*, 44(18):499, Sept. 15, 1957. refs. **DWB**—In recent years the sensitivity of colloid systems to solar activity has been recognized as an important factor in biological reactions. Especially widely distributed is the serum reaction of Takata which has led to much speculation. Some authors have doubted its existence, but many daily rhythms have been discovered. Author with H. KASTNER investigated serum of 77 healthy men at 2–3 day intervals over 4–6 weeks and compared with 4 hr weather charts. This showed clearly that the Takata reaction is not due to weather changes and must be attributed to abnormal spot numbers. *Subject Headings:* **1. Takata reaction 2. Sunspot effects.**—*C.E.P.B.*

TEMPERATURE

See also: **Heat exchange sea-atmosphere** (Strokina), 9.1–85; **Satellite ionosphere temp. measurement** (Hok et al.), 9.1–95; **Atmospheric temp. for aircraft design** (McNaughton), 9.1–98; **Frost effects on construction** (Bruchmayer), 9.1–112; **Freezing temp. data, S. Dakota** (Pengra), 9.1–125; **Temp. data, S. Dakota** (Pengra), 9.1–126; **Frost protection** (Morgen), 9.1–159; **Pacific jet stream** (Hoyle), 9.1–183; **Temp. anomalies** (Krueger), 9.1–184.

9.1–212 551.524.3

Bagrov, N. A. and Shabunina, T. A., **Izmenchivost' srednikh mesiachnykh temperatur na territorii Severnoĭ Evrazii.** [Variability of the mean monthly temperatures over northern Eurasia.] *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy*, 46(73):53–63, **1956.** 8 figs., 4 tables, 6 refs. **DLC**—In this statistical study, the author discusses the square deviations of the mean monthly temperatures, the annual variations of the mean square deviation for the temperature of Moscow, Irkutsk, etc., the distribution of mean monthly temperature, the probability of deviation of mean monthly temperature from the normal within particular limits. *Subject Headings:* **1. Mean monthly temperatures 2. Temperature variability 3. Northern Eurasia.**—*I.L.D.*

9.1–213 551.524.31:581.14

Schwemmle, B., **Zur Temperaturabhängigkeit der Blütenbildung und der endogenen Tagesrhythmik bei Kalanchoë Blossfeldiana.** [Temperature dependence of flower formation and the endogenous daily rhythm of *Kalanchoë Blossfeldiana.*] *Naturwissenschaften*, 44(12): 356, June 15, **1957.** fig., table, 7 refs. **DWB**—Short periods of high temperature (35°C) delayed flowering the more the later the high temperature occurred. *Subject Headings:* **1. Bioclimatology of plants 2. Temperature effects on plants.**—*C.E.P.B.*

9.1–214 551.524.4:551.571.4:551.526.8

Timofeev, M. P., **O transformatsii vozdukha nad vodoemami.** [Transformation of the atmosphere over reservoirs.] *Meteorologiia i Gidrologiia*, Leningrad, No. 6:26–29, Nov./Dec. **1955.** 3 figs., 6 refs., 5 eqs. **DWB, DLC**—The author analyzes quantitatively the temperature and humidity changes occurring in air as it moves over reservoirs using the turbulent diffusion equations of which a solution is given in the form

$$q = q_1 + (q_n - q_1) F\left(\frac{1}{L} \cdot 2_p\right),$$

where q_1—initial atmospheric humidity, q_n—maximum humidity corresponding to the temperature of the water surface, $F\left(\frac{1}{L} \cdot 2_p\right)$—a known function. With this formula it is shown that the atmospheric moisture changes most intensely during the critical period of movement of the atmosphere over the reservoir, the change in atmospheric moisture over the reservoir depends upon the initial atmospheric moisture, and it is greater the higher is the temperature of the surface of the reservoir; and it is shown that the heat transformation of the atmosphere is not only quantitative but involves also a change in temperature stratification. *Subject Headings:* **1. Atmospheric transformation over reservoirs 2. Temperature profiles.**—*I.L.D.*

9.1–215 551.524.7:551.510.535:551.594.12

Akasofu, Syunpichi (*Nagasaki Univ.*), **Effects of the variation of the temperature gradient in the upper atmosphere on the formation of the ionospheric layers.** *Tohoku Univ., Science Reports, 5th Ser., Geophysics*, 5(3):123–139, Dec. **1953.** 7 figs., 3 tables, 34 refs., eqs. Also: Kamiyama, Hiroshi (*Tohoku Univ.*), **Remarks . . .** *Ibid.*, p. 140. 3 eqs. **DWB, DLC**—On the assumption that the temperature gradient varies with height in the course of a day, calculations are made about the ion production rate and the electron density. The variation of the ion production rate in the F2-region is almost contrary to that shown by CHAPMAN, whereas in the E- or F-region the variation shows CHAPMAN's mode. The anomalous variation

of the maximum electron density in the F2-region on the equator, at equinox, is explained by the changes of the temperature gradient. It is also noted, however, that the total number of electrons in the F2-region is proportional to $\cos\chi$. A brief discussion is made to distinguish the solar tide from the solar heating. In his remarks KAMIYAMA develops equations from which it appears that in order to account for the anomalous variations of electron density at the F2 layer it is not necessary to assume that temperature increases with height in the E and F regions but is constant in the intermediate region, as was done by S. AKASOFU. A satisfactory explanation for the electron density anomalies can be found by assuming temperature to increase exponentially. *Subject Headings:* **1. Ionospheric temperatures 2. Ionospheric electron density.**—*Authors' abstract and G.T.*

9.1–216 551.524.7:551.557.32:551.571.7:551.513

Kimachi, T., **On the seasonal change of upper troposphere.** *Journal of Meteorological Research*, Tokyo, 5(5):369–378, June **1953.** 5 figs., 9 refs. In Japanese; English summary p. 369. **DWB**—Discontinuities in the annual changes of tropopause height, upper-air temperature distribution, jet stream, upper-air wind and mixing ratio over Japan are identified and found to correspond to changes of season according to TAKAHASHI's classification of climatic seasons. *Subject Headings:* **1. Upper air temperature variations 2. Upper air wind variations 3. Upper air humidity variations 4. Jet stream 5. Japan.**—*G.T.*

9.1–217 551.524.7:551.510.53

Penndorf, R. (*Air Force Cambridge Research Center*), **Remarks to the note by R. Grandmontagne.** *Annales de Géophysique*, 10(3):248, July/Sept. **1954.** table. Commentary in French by GRANDMONTAGNE. **DLC**—Stratospheric temperature data should not be computed from raw pressure data due to their inherent errors. Physically impossible superadiabatic gradients are obtained otherwise. (For abstract on original, *see* 5.2–31, Feb. 1954, *MAB.*) *Subject Heading:* **1. Stratospheric temperature. I. Grandmontagne, R.**—*A.A.*

9.1–218 551.524.7:551.510.52/3

Vercelli, Francesco, **I nuovi problemi della stratosfera.** [New problems of the stratosphere.] *Società Italiana per il Progresso delle Scienze, Rome, Oct. 1932, Atti*, vol. 1 (reprint of 15 p.), pub. **1933.** fig. **DLC.** Also issued as *Trieste. Istituto Geofisico, Pubblicazioni*, No. 69. **DWB**—A detailed model of the troposphere-stratosphere temperature regime from 0°–90°N in summer and winter (0–18 km) shows tropopause ~4 km at North Pole in winter and <7 km in summer, and highest (18 km) at the very equator. Other features of the stratosphere, ionosphere, ozonosphere, as well as radiation balance of the troposphere-stratosphere, are discussed in the light of current (1933) knowledge. *Subject Headings:* **1. Stratospheric temperatures 2. Tropospheric temperatures 3. Radiation balance.**—*M.R.*

WATER TEMPERATURE

See also: **Heat exchange sea-atmosphere** (Strokina), 9.1–85; **Sea temp. variations** (Baranov, Shpaikher), 8.1–86.

9.1–219 551.526.8

Czepa, O. and Schellenberger, G., **Über den Wärmehaushalt des Breiten Lucin- und Haussees bei Feldberg (Mecklbg.).** [Heat economy of the Breiter Lucin- and Haussee Lakes near Feldberg, Mecklenburg.] *Acta Hydrophysica*, Berlin, 3(4):161–180, **1956.** 4 figs., 6 tables, 12 refs., numerous eqs. **DLC**—Dates for thermal jump layer are given. The vertical temperature distribution helps to compute the changes in total heat capacity. Global radiation, albedo, long wave radiation and convection are considered for evaluating the evaporation. The results are in reasonable agreement with measured values on other lakes. A graph shows the dependency of the "austausch" coefficient on wind speed. *Subject Headings:* **1. Heat balance of lakes 2. Limnology 3. Mecklenburg, Germany.**—*A.A.*

PRESSURE AND WIND

PRESSURE

See also: **Lee waves** (Holmboe, Klieforth), 9.1–21; **Pressure effects on heart disease** (Gressel), 9.1–114; **Upper air forecasting charts** (Piper), 9.1–153.

9.1–220 551.543.3

Dewey, Edward R., **The 7.6-year cycle in barometric pressure at New York City, 1873–1955.** *Cycles*, N. Y., 7(11):297–298, Nov. **1956.** 2 figs. **DLC**—Although the noncyclical element is stronger than the cyclical, the pressure data for New York City for 1873–1955 shows a 7.6-year cycle (previously reported by the author as 7.8 years, based on shorter record), which is inversely related to a 7.54 year cycle in sunspots and in pressure all over the world (CLAYTON), and a 7.6 year cycle in price of pig iron (1784–1950). The pressure cycle, 3 year smoothed averages, is only 0.02 "from trough to crest." *Subject Headings:* **1. Pressure cycles 2. New York, N. Y.**—*M.R.*

9.1–221 551.547.3:519.241.6

Jenkinson, A. F., **Standard deviation of the height of the 500-mb surface over the North Atlantic.** *Meteorological Magazine*, London, 86(1022):245–249, Aug. **1957.** 4 figs. **DWB**—Charts are drawn of S.D. of 500 mb surface at 1500 G.M.T. daily for Jan., April, July and Oct. 1949–53. *Subject Headings:* **1. Standard deviation 2. Upper air pressure variations.**—*C.E.P.B.*

TURBULENCE AND GUSTINESS

See also: **Airplane observation of gustiness** (Walker), 9.1–101; **Thermal currents** (Parczewski), 9.1–234.

9.1–222 551.551:629.13

Diederich, Franklin W. (*Calif. Inst. of Tech.*), **Response of an airplane to random atmospheric disturbances.** *U. S. National Advisory Committee for Aeronautics, Technical Note*, 3910, April **1957.** 95 p. 6 figs., table, 18 refs., 96 eqs. **DWB**—The statistical approach to the gust-load problem which consists in considering flight through turbulent air to be a stationary random process is extended by including the effect of lateral variation of the instantaneous gust intensity on the aerodynamic forces. The forces obtained in this manner are used in dynamic analyses of rigid and flexible airplanes free to move vertically, in pitch, and in roll. The effect of the interaction of longitudinal, vertical, and lateral gusts on the wing stresses is also considered. *Subject Headings:* **1. Gust loads 2. Aircraft response to atmospheric turbulence.**—*Author's abstract.*

9.1–223 551.551

Mitchner, Morton (*Res. Fellow, Combustion Aerodynamics Lab., Harvard Univ., Cambridge, Mass.*), **Propagation of turbulence from an instantaneous point disturbance.** *Journal of Aeronautical Sciences*, 21(5):350–351, May **1954.** 2 figs., 2 refs. **DLC**—Experimental research on the origin of turbulence pattern from a point source in a laminar boundary layer was performed on water flowing in an inclined rectangular channel and in a wind tunnel over a flat plate. Characteristic turbulent spots were observed and their geometry is discussed. *Subject Headings:* **1. Turbulence research 2. Wind tunnel experiments.**—*A.A.*

9.1–224 551.551.25:629.13

Eggleston, John M. and Diederich, Franklin W. (*Langley Aeronautical Lab., Langley Field, Va.*), **Theoretical calculation of the power spectra of the rolling and yawing moments on a wing in random turbulence.** *U. S. National Advisory Committee for Aeronautics, Technical Note*, 3864, Dec. **1956.** 9 figs., 2 tables, 17 refs., 59 eqs. **DWB, DLC**—An analytical solution

is derived for the power spectral density of the rolling- and yawing-moment coefficients of a wing subjected to random isotropic atmospheric turbulence. The theory considers the random variations of the turbulence in the spanwise as well as the flight-path direction. Horizontal, vertical, and side gust components are considered. Plots of the power spectra are presented. *Subject Headings:* **1. Power spectra 2. Aircraft response to atmospheric turbulence 3. Gust loads.**—*NACA abstract.*

9.1–225 551.551.25

Jones, J. I. P. and Butler, H. E., **Studies of eddy structure in the first few thousand feet of the atmosphere. Pt. 1. Measurements of the vertical and horizontal (longitudinal) components.** *Great Britain. Meteorological Research Committee, M.R.P.*, 1038, Feb. 7, **1957.** 8 p. 18 figs., 2 refs. Also: Jones, R. A., **Pt. 2. A preliminary examination of the spectrum and scale of the vertical component at 2000 feet.** *Ibid.*, No. 1044, Feb. 26, **1957.** 16 p. 3 figs., 2 tables, 19 refs., eqs. **DWB**—*M.R.P.* 1038 gives details of minor modifications of the instrument described by J. I. P. Jones in *M.R.P.*, 974, Feb. 28, **1956** (*see* 7.11–122, Nov. 1956, *MAB*), for measuring vertical gustiness by inclination and speed of the wind. A modified Ower airmeter was used to record fluctuations of total wind speed. Both instruments were mounted on a captive balloon cable and gave a response of 90% with a period of 2.4 sec (70% at 1.0 sec) through an electronic integrator. Air temperature was measured with a thermistor. Some observations at Cardington up to 7000 ft in 1956 are described and illustrated. In *M.R.P.*, 1044 R. A. Jones uses data of wind inclination at 2000 ft for a preliminary estimate of the energy spectrum of the vertical component of turbulence of frequency 1/75 to 1/5 cycles per sec. Various methods of calculation are discussed. Appendices describe the Fourier-transform method after J. W. Tukey and errors and modifications in it. Also issued as: *Porton, Eng. Chemical. Defence Experimental Establishment. Porton Technical Paper*, No. 574, **1957** (*see* 8.9–134, Sept. 1957, *MAB*). *Subject Headings:* **1. Turbulence in the frictional layers 2. Turbulence spectrum.**—*C.E.P.B.*

9.1–226 551.551.8:551.508.59

Seneca, J., **Mesures de diffusivité turbulente sur des flocons de fumée.** [Measurement of turbulent diffusion by means of smoke puffs.] *Journal Scientifique de la Météorologie*, Paris, 7(26):221–225, April/June **1955.** 7 figs., 5 refs., eqs. French, English and Spanish summaries p. 221. **DWB**—The author's simple apparatus for producing smoke puffs of $TiCl^4$ is described and illustrated, the method of cinematography described, equations of diffusion set forth, and actual experimental results presented in graphs and discussed. The puff increases rapidly in the first phase (20–30 sec) then grows less rapidly up to 100–150 sec during which time the normal diffusivity can be calculated, then enters a decreasing phase as the puff becomes attenuated. Relations to height, lapse rate, wind speed, etc. allow a normal curve to be drawn for increase in diffusivity with height (to 500 m). *Subject Headings:* **1. Smoke puff diffusion experiments 2. Turbulent diffusion-height relationships 3. Turbulent diffusivity measurements 4. Magny-les-Hameaux, France.**—*M.R.*

9.1–227 551.551.8

Saïssac, J., **Sur la diffusion turbulente homogène des particules.** [Homogeneous turbulent diffusion of particles.] *Journal Scientifique de la Météorologie*, Paris, 7(26):227–232, April/June **1955.** 3 figs., 4 refs., 12 eqs. French, English and Spanish summaries p. 227. **DWB**—The equations for turbulent diffusion are discussed in connection with the smoke puff experiments carried out by Seneca (*see* 9.1–226) at the Magny-les-Hameaux Observatory (France). It is stated that the equations are valid for constant diffusivity when the diffusion depends on time. Variations of diffusivity with radius (ρ) of the smoke puff, and with time are shown graphically for two independent sets of data. *Subject Headings:* **1. Smoke puff diffusion experiments 2. Turbulent diffusivity measurements 3. Magny-les-Hameaux, France.**—*M.R.*

WIND DISTRIBUTION

See: **Wind power projects** (Tagg), 9.1–113.

WIND VARIATIONS AND SPECIAL WINDS

See also: **Sandstorm effects on cardiovascular system** (Lemaire, Jolly), 9.1–116; **Gale frequencies** (Lamb), 9.1–128.

9.1–228 551.555.9:551.558.21

Bachurina, A. A. and Gus'kova, V. G., **Issledovanie sukhoveia, nabliudavshegosia v iiune 1948 g. na iugo-vostoke Evropeiskoi Territorii SSSR.** [An investigation of the dry winds observed in June 1948 over S.E. European U.S.S.R.] *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy*, 46(73):64–78, **1956.** 7 figs., 8 tables, 5 refs., eqs. **DLC**—An investigation of the course of development of the "Sukhovei" winds which prevailed from June 18 to June 28, 1948. The author analyzed synoptic charts, charts of pressure topography and emagrams. Atmospheric temperature changes to a height of 5 km above the earth's surface were studied by constructing stratification charts and calculating advection. Vertical motion produced by deviation of wind from the geostrophic and the effect of friction and vertical convection motions were calculated. Discussion, charts and data cover the following: magnitude of temperature and relative humidity in the "Sukhovei" zone at the earth's surface during June 1948, atmospheric processes caused by the "Sukhovei," area of origin and spread of "Sukhovei," mean vertical velocity of convection and occurrence of cloudiness during the day in the "Sukhovei" zone, changes in air temperature and relative humidity produced by advection and dry adiabatic processes, temp., rise of westerly air over European S.S.R. during the "Sukhovei" period, etc. *Subject Headings:* **1. Sukhovei 2. Sukhovei effects 3. Vertical motion 4. U.S.S.R.**—*I.L.D.*

WIND EFFECTS

See also: **Tidal waves** (Defant), 9.1–81; **Wind power projects** (Tagg), 9.1–113.

9.1–229 551.556.4:551.311.3

Bagnold, R. A. (*Royal Society, London*), **Surface movement of blown sand in relation to meteorology.** (In: International Symposium on Desert Research, Jerusalem, May 7–14, 1952, **Proceedings,** p. 89–96, pub. **1953.** Discussion p. 94–96.) **DWB**—The author discusses the distinction between dust and sand as determined by size or by wind force required to disturb either of them, the erosive action of wind and sand; experimental methods for defining the strength and character of the natural wind at ground level, taking into account not only the virtual velocity gradient but also turbulent air motion (vortices) produced by thermal heating of soil; the phenomenon of roller vortices; the role of secondary thermal circulation in sand movement over large plains; the thermal origin of sand ridges and sand dunes, etc. *Subject Headings:* **1. Sand transport 2. Wind erosion 3. Sand dunes.**—*I.L.D.*

UPPER AIR WINDS

See also: **Upper air wind measurement** (Barbe), 9.1–17; **Wind variation with height** (Durst), 9.1–121; **Computing winds aloft** (Gould), 9.1–122; **Pacific jet stream** (Hoyle), 9.1–183; **Jet stream effects** (Palomares Casada), 9.1–187; **Jet stream** (Sawyer), 9.1–188; **Upper air wind variations** (Kimachi), 9.1–216.

9.1–230 551.557.2:551.513

†*Plagge, H. J. and Smith, L. B., **Project Rawijet: a study of the wind variability in space and time at the Salton Sea Test Base.** *Sandia Corporation, Research Report* SC-3880 (TR), Dec. 10, **1956.** 68 p. figs., tables, 15 refs. **DWB** (M57.2 P698p)—A program of hourly upper air wind observations was carried on at 5 stations by the Sandia Corp. and the U. S. Air Weather Service at the Salton Sea Test Base in S. California under various synoptic conditions in Feb.–April 1954. On April 5, 1954, balloons were released at 15-min intervals. In one series all units tracked the same balloon. A total of 530 balloon observations reaching

100 mb or 55,000 ft were used in the study. Data are presented in tables and graphs. Previous work is reviewed, instrumentation and methods described in detail, errors due to instruments, to personnel and to bias analyzed. Actual space and time variations in winds at the various altitudes are tabulated to show magnitude of such variations. *Subject Headings:* **1. Upper air wind variations 2. Space-time variations in winds 3. Upper air wind accuracy 4. Project Rawijet 5. Salton Sea, Calif. I. Project Rawijet II. Sandia Corporation.**—*M.R.*

9.1–231 551.557.36:519.24(595)

Clarkson, L. S., **Non-circular wind distributions.** *Meteorological Magazine*, London, 86(1023):278–279, Sept. **1957.** table, 4 refs. **DWB**—Suggests that normal circular distributions are not characteristic of monthly 50,000 ft winds over Singapore, which are elliptically distributed. *Subject Headings:* **1. Upper air wind frequencies 2. Statistical studies 3. Singapore.**—*C.E.P.B.*

9.1–232 551.557.36:519.24(595)

Clarkson, L. S., **Note on the mean characteristics of the maritime equatorial troposphere over Singapore.** *Meteorological Magazine*, London, 86(1023):273–276, Sept. **1957.** 3 tables, 2 refs. **DWB**—Meteorological flights over Singapore to 200 mb 1949–54 and radiosonde ascents to 100 mb 1954–55 are analyzed. Real variations of temperature at any pressure level are very small. *Subject Headings:* **1. Upper air temperatures 2. Statistical studies 3. Singapore.**—*C.E.P.B.*

9.1–233 551.557.36:519.24

Essenwanger, Oskar and Holzapfel, Rupert, **Versuch einer Deutung der Luftbewegung über Mitteleuropa.** [Search for a meaning of the air movement over central Europe.] *Meteorologische Rundschau*, 10(4):119–124, July/Aug. **1957.** 2 tables, 7 refs. **DWB**—Radiosonde winds to 16 km at Berlin and Munich 1949–53 for 4 seasons and 4 directions are expressed as sums of Gaussian normal curves, usually 4, occasionally 3 or 5. Mean a_0, σ^2, height of mean h_0 and $n^0/_{00}$ suffice. Berlin is orographically undisturbed, Munich influenced by Alps. The directions W., N., E. and S. form independent "circulation bodies" superposed on general W. drift. *Subject Headings:* **1. Upper air wind frequencies 2. Statistical techniques 3. Central Europe.**—*C.E.P.B.*

VERTICAL MOTION

See also: **Lee waves** (Holmboe, Klieforth), 9.1–21; **Soaring pilot** (Welch), 9.1–99; **Sukhovei** (Bachurina, Gus'hova), 9.1–228.

9.1–234 551.558.1:551.551

*Parczewski, Władysław, **Les conditions thermodynamiques dans la couche inférieure de l'atmosphère d'après les vols des modèles réduits.** [Thermodynamic conditions in the lower layer of the atmosphere according to the flights of models.] *Acta Geophysica Polonica*, Warsaw, 1(3/4):147–161, **1953.** 6 figs., 2 tables. In French; Polish summary p. 160–161. **DWB**—Analysis of observations made during the international conference of flying models at Poznan in Sept. 1951. Discusses relations between the formation of thermic "chimneys" and the periodicity of gusts, as well as between vertical currents and the daily course of the wind speed and air temperature. Synoptic situations and vertical temperature distributions are shown. *Subject Headings:* **1. Thermal currents 2. Gustiness 3. Poznan, Poland.**—*A.A.*

9.1–235 551.558.29:551.510.534

Paetzold, Hans-Karl, **Zur Analyse von atmosphärischen Transportvorgängen durch Variationen des Ozons.** [On the analysis of atmospheric transport processes by variations of ozone.] *Annalen der Meteorologie*, 8(1/2):40–46, **1957.** 9 figs., table, 7 refs. **DWB**—On May 30, 1956 a balloon carrying a UV spectrograph reached 44 km at Weissenau. The first transport process is a downward current of 10^{11} O_2 mol/cm²/sec by turbulent vertical exchange 20 km-ground. There are maxima at 23 km (photochemical), 15 and 6 km (horizontal advection) depending on season but very variable due to vertical movements. *Subject Headings:* **1. Vertical ozone distribution 2. Ozone transport 3. Weissenau, Germany.**—*C.E.P.B.*

AQUEOUS VAPOR, HYDROMETEORS AND HYDROMETEOROLOGY

EVAPORATION AND EVAPOTRANSPIRATION

See also: **Pan evaporimeters** (Parthasarathy, Misra), 9.1–139; **Radiation balance and evaporation** (Michalowsky), 9.1–199.

9.1–236 551.573:551.582.3

*Australia. Meteorological Branch, **Evaporation, estimated from saturation deficit (in inches) using the Waite formula E = 21.2 S.D. modified by reference to actual evaporation records.** Rev. May **1953.** issued **1954.** unpaged. 15 charts (fold.). **DWB**—Large, nicely drawn charts for Australia (with inset for Tasmania), showing isarithms of evaporation for the year, for May–Oct., for Nov.–April and for each individual month. Intervals of 10″ (20″ to 110″) are used for the annual totals, 5″ for the seasonal (5″–50″ in winter and 15″–70″ in summer), and 1″ (3″–14″ in Dec. and Jan., ½″–8″ in July). In S.E. Australia and Tasmania lines are drawn for ½″ intervals up to 2″. *Subject Headings:* **1. Evaporation charts 2. Australia 3. Tasmania.**—*M.R.*

9.1–237 551.573

*Demianczuk, Piotr Pawel, **Zdolnosc potencjalna parowania w przedziale wplywu slonca, Czesc II.** [Potential evaporability during the time of sunshine, Pt. 2.] *Poland. Panstwowy Instytut Hydrologiczno-Meteorologiczny, Wiadomosci Sluzby,* 3(5):391–410, **1955.** 43 tables, numerous eqs. Russian and French summaries p. 410. **DWB**—In Pt. 2 of the paper, the author derives formulas of the evaporation value on individual months of the year taking into account the wind speed. The quantity of evaporated water in mm, is expressed by the following formula: $P_r,m \approx \alpha \cdot B \cdot \beta_r,m$, where α is the exchange coefficient which includes the influence of wind on evaporation; B is the coefficient depending on the mean monthly value of atmospheric pressure and mean monthly air temperature value. The values of B are given in the tables; β_r,m is the mean humidity deficit value of air in individual months of the year obtained from daily values of the mean monthly value of the air humidity deficit, considering corrections of OLDEKOP. Calculations of evaporability values based on the formula are in good agreement with results of measurements made. (For Pt. 1, *see* 7.3–222, March 1956, *MAB.*) *Subject Headings:* **1. Potential evaporation 2. Solar influences 3. Evaporation formulas.**—*Author's abstract.*

9.1–238 551.573 551.579.1

Gabites, J. F., **Estimation of natural evaporation and water need.** *New Zealand. Meteorological Service, Meteorological Office Note,* No. 43, **1956? DWB.** "Reprinted from Proceedings of the Conference on Soil Moisture held at Dominion Physical Laboratory, Sept. 1954, and issued in *New Zealand. Dept. of Scientific and Industrial Research, Information Series,* No. 12, **1956,** p. 122–131." 6 figs., 20 refs.—Emphasizes the limitations of the measurement of evaporation and potential evapotranspiration. THORNTHWAITE's method is used to compute water need and maximum evaporation for New Zealand. A cheap, reliable soil moisture indicator, however, would help the individual farmer more than empirical or theoretical estimates of water need. *Subject Headings:* **1. Potential evapotranspiration 2. Evaporation 3. Thornthwaite's method 4. New Zealand.**—*A.A.*

9.1–239 551.573:551.579(624)

Haude, Waldemar, **Über nutzlose Evaporation verschiedener Böden in einem Trockenklima.** [On needless evaporation from different soils in a dry climate.] *Meteorologische Rundschau,* 10(4):124–127, July/Aug. **1957.** 4 figs., 4 tables. **DWB**—In Egypt potential evaporation was measured in small tanks filled with Nile earth, sand, or ⅔ sand and ⅓ earth. Evaporation by THORNTHWAITE's formula was 200 mm in June, 60% of measured value. Annual variation was almost proportional to global radiation and to values given by a freely suspended Piche. Actual evaporation was measured in May through Oct. in tanks filled with earth and Popoff cylinders with earth and sand and watered at intervals. Loss from

sand in 2 and 7 days was 35% less than from equally moist Nile earth, but water capacity of mixture of earth and sand is less and it must be irrigated more frequently, though needless loss is still less than from Nile earth. *Subject Headings:* **1. Evaporation from soil 2. Egypt.** —*C.E.P.B.*

CONDENSATION

See also: **Condensation nuclei** (Grabovskiĭ), 9.1–8; **Radiation diffusion by droplets** (Bricard), 9.1–19; **Icing probabilities** (Jailer), 9.1–22; **Aircraft icing** (Rohan, Ohaonghusa), 9.1–100; **Retention of atmospheric condensation nuclei in the respiratory tract** (Verzár et al.), 9.1–118; **Nucleation of supercooled water** (Montmory), 9.1–259.

9.1–240 551.574.42:001

Grunow, J. (*Met. Observ. Hohenpeissenberg*), **Zur Definition und Beobachtungstechnik von Nebelfrostablagerungen.** [Definition and observation technique of rime deposits.] *Wetter und Leben*, Vienna, 7(8/11):211–212, **1955.** fig. **DLC**—The problem of classifying and differentiating between various types of rime deposits such as hard and soft rime is discussed. The author considers as adequate the definitions of H. KÖHLER, namely: soft rime is characterized by hexagonal crystals; hard rime is amorphously frozen drops, a type characterized by an amorphous mass of ice. A series of symbols for describing the various types of rime and amount of deposition are presented. *Subject Headings:* **1. Definitions 2. Rime.**—*I.L.D.*

9.1–241 551.574.1:532.72

Facy, L., **Sur la capture par la phase condensante des particules submicroscopiques soumises à un gradient de tension de vapeur.** [Capture during the condensation phase of submicroscopic particles under a vapor pressure gradient.] *I.U.G.G. Association of Meteorology, Rome, Sept. 1954, Scientific Proceedings.* London, Butterworth, **1956.** p. 58–61. **DWB**—Using a technique similar to that employed in studying a particle cloud in a cloud chamber, the author created a vapor pressure gradient of a gas in a chamber and studied the diffusion of gas molecules from the source by their impact upon submicroscopic particles suspended in the atmosphere. The transport of vapor is rendered visible by the displacement of the particles, which can be measured easily. An expression is obtained for the velocity of displacement of a particle under a regime of permanent diffusion of a vapor and the capture of submicroscopic particles during condensation by a purely kinetic molecular process is discussed in general and with reference to cloud formation and artificial snowfall. *Subject Headings:* **1. Condensation nuclei theory 2. Diffusion processes.**—*I.L.D.*

9.1–242 551.574.1:551.594.1/2

Herpertz, E.; Israël, H. and Verzár, F., **Vergleich luftelektrischer Messungen mit der Kondensationskernzahl auf Jungfraujoch (3578 m. ü M.).** [Comparison of atmospheric electric measurements with condensation nuclei count on Jungfraujoch, 3578 m elevation.] *Geofisica Pura e Applicata*, Milan, 36:218–232, Jan./April **1957.** 7 figs., 6 tables, 11 refs., 18 eqs. English and German summaries p. 218. **DLC**—For the first time comparisons are made in an atmosphere with a small number of condensation nuclei, between the content of condensation nuclei and atmospheric electrical elements. The simplified equation for the recombination is valid in this range of nuclei content too. The dispersion of single values is very great. The causes for these dispersions are briefly mentioned. The solution of the equation of re-combination is evolved into an exponential function for the case of small nuclei content. An exact statement for the absolute value of conductivity cannot be given on the basis of this equation. This equation provides information on the relations of variations of conductivity and numbers of nuclei: $d\Lambda/dZ = -x\Lambda$. Some diurnal variations of the monthly means are demonstrated. *Subject Headings:* **1. Condensation nuclei count 2. Atmospheric electricity measurements 3. Charged nuclei 4. Jungfraujoch, Switzerland.**—*Authors' abstract.*

9.1–243 551.574.1:551.508.91

*Herpertz, E. and Verzár, F., **Versuch zur charakterisierung atmosphärischer Kondensationskerne durch Koagulationsmessungen und durch Messungen bei vershiedenen Expan-**

sionen. [Attempt at characterizing atmospheric condensation nuclei by means of coagulation measurements and measurements at different expansions.] *Geofisica Pura e Applicata*, Milan, 36:118–126, Jan./April **1957.** 6 figs., 3 tables, 8 refs. **DLC**—The number of atmospheric condensation nuclei shows daily variations and also local differences. To test whether the nuclei are also different in quality and size two methods have been tried: Air was collected in a balloon and the coagulation followed by measuring the number of nuclei during 8 to 9 hrs. Examples are given for air in Basel at 11 a.m. and at 4 a.m. Also differences are shown between the air in Basel (270 m) and St. Moritz-Bad at 1800 m altitude. The coagulation of air samples was also studied with different expansion pressure up to 9 hrs. All measurements were made with the automatic condensation nuclei counter. No definite conclusions are drawn but the value of these methods shall be studied especially in connection with meteorological observations. *Subject Headings:* **1. Diurnal nuclei variations 2. Nuclei geographical distribution 3. Nuclei size 4. Nuclei counters.**—*Authors' abstract.*

9.1–244 551.574.1:061.3

Mason, B. J., **Recent developments in cloud physics.** *Nature*, London, 180(4586):573–574, Sept. 21, **1957. DWB**—Account of discussion on cloud physics at Roy. Meteor. Soc. meeting in Glasgow, July 3–5, 1957. B. J. Mason described experiments on supercooling and nucleation of water, and growth of ice crystals from vapor. Water had been so purified that droplets could be supercooled to temperatures of −41°C (1μ drops) to −33° (1 mm drops). Photography of freezing droplets showed that solidification was accompanied by liberation of small ice splinters. Tests of nucleating ability of soil particles are described. R. J. Murgatroyd described measurements of nuclei, cloud particles and rain from an aircraft. Larger hygroscopic nuclei are most active. Conditions in CiSt and ASt were described. T. W. Wormell discussed electrification of precipitation near the ground by splashing and turbulent upward diffusion of a negative space charge. *Subject Headings:* **1. Cloud physics 2. Conferences.**—*C.E.P.B.*

9.1–245 551.574.2

Schaefer, Vincent J. (*Dir. of Res., Munitalp Found., Inc.*), **Silver iodide as an ice nucleus (Simple experiments in atmospheric physics, Pt. 5).** *Weatherwise*, Boston, 8(6):141–143, Dec. **1955. DWB**—The properties of silver iodide and the behavior of AgI and of Ag and I separately, and the adsorption of iodine vapor on microscopic Ag particles are discussed with respect to the nucleating activity of AgI—up to now the most effective agent for production of ice particles from supercooled clouds of water vapor. A single silver particle can be detected in the air if the methods described are carried out with care. Methods of production of AgI vapor of .01μ diameter are discussed and compared. 5 g of AgI powder produce 10^{18} particles if vaporized. *Subject Headings:* **1. Silver iodide nuclei 2. Cloud physics experiments.**—*M.R.*

9.1–246 551.574.41

*Kobysheva, N. V., **Metody opredeleniia rosy i ee geograficheskoe raspredelenie.** [Methods of determining dew and its geographical distribution.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy*, 61 (123):70–84, **1956.** 11 figs., 2 tables, 16 refs. **DWB**—The author takes up successively the following questions: 1) Influence of dew on vegetation and some processes of agricultural production; 2) Experimental methods of determining dew; 3) M. E. Berliand's method of determining the quantity of dew, and its verification; 4) Forecasting of dew, and its calculation in the forecasting of fog; 5) The geographical distribution of fog. Charts show mean number of days with dew in a year, and during the growing season, respectively, and the total amount of dew in a year (mm) for European U.S.S.R. Results of dew measurements at various places and by various methods are shown on diurnal graphs. Nomograms are also presented for calculation. *Subject Headings:* **1. Dew observation 2. Dew measurements 3. U.S.S.R.**—*A.M.P., M.R.*

9.1–247 551.574.42:621.39

Råstad, H. (*Oslo*), **Erfahrungen über Vereisung von Fernleitungen in Norwegischen Gebirgen (Auszug).** [Experiences on icing of long distance lines in the Norwegian mountains: (Summary).] *Wetter und Leben*, Vienna, 7(8/11):196–199, **1955. DLC**—The heavy ice

deposits on long distance lines in the Norwegian mountains are termed "weather ice"; it consists primarily of rime but occasionally also of glaze and melted snow. The author discusses the magnitude of ice load deposited upon high tension lines at various elevations in the Norwegian mountains, the relationship between icing load and elevation, and between icing load and wind, the magnitude of the ice load upon a cable perpendicular to the wind direction as compared with that on a cable parallel to the wind direction and the invalidity of a formula expressing a relationship between cable diameter and ice load. *Subject Headings:* **1. Ice loads on communication wires 2. Rime deposits 3. Norwegian mountains.**—*I.L.D.*

FOG

See also: **Fog in the German Bight** (Bintig, Narkgraf), 9.1–18; **Smog damage to plants** (Bobrov), 9.1–162; **Infrared radiation through fog** (Arnulf et al.), 9.1–204; **Cloudiness effects on infrared radiation, Frankfurt** (Kreitz), 9.1–209.

9.1–248 551.575:551.521.3

Volz, Friedrich, **Die spektralen Eigenschaften der Dunstsubstanz: UV-Absorption von Niederschlagswasser und der Dunsteinfluss auf die langwellige atmosphärische Strahlung.** [The spectral properties of haze aerosol: UV absorption of precipitation and the influence of haze on long wave atmospheric radiation.] *Annalen der Meteorologie*, 8(1/2):34–39, **1957.** 3 figs., 13 refs. English summary p. 39. **DWB**—Measurements of the UV transmission ($\lambda \geqq 0.22\mu$) of rainwater show a strong and steady increase of the absorption coefficient with decreasing wavelength. Snow water often has an absorption maximum near 0.27μ. The absorption of thin layers of dry salt-residues of rainwater is measured in the visible part of the spectrum; the "specific absorption" (absorption coefficient for path length 1 milligram per $cm^2 \approx 5\mu$) is in good agreement with the results for rainwater. Thus the refractive index of haze particles becomes $n' = 1.53 - 0.007i$. The infrared absorption spectra (2 to 15μ) from dry rainwater salts show strong absorption near 3 and 9μ. The measurements show that dry haze cannot influence the long wave radiation of water vapor in the atmosphere, because the amount of absorption is far too low. *Subject Headings:* **1. Ultraviolet absorption 2. Long wave absorption 3. Aerosol absorption 4. Haze effects.**—*Author's abstract.*

CLOUDS

See also: **Cirrus cloud bibliogs.** (Martin), 9.1–24; **Cloud atlas for observers in aircraft** (WMO), 9.1–33; **Cloud base height indicators** (Fateev), 9.1–142; **Cloud height estimates** (Vorob'ev), 9.1–143; **Wilson cloud chamber** (Gabor, Hampton), 9.1–146; **Cumulus cloud formation** (Wachter), 9.1–178; **Infrared radiation through clouds** (Arnulf et al.), 9.1–204; **cloud physics** (Wexler, Austin), 9.1–260.

9.1–249 551.576.1

Stratocumulus clouds. *Meteorological Magazine*, London, 86(1022):230–241, Aug. **1957.** refs **DWB**—Meteorological Office discussion on March 18, 1957 was opened by D. G. JAMES who dealt with a sheet of StCu under a dry type inversion, and the physical processes eading to its dissipation. Inversion is due to subsidence intensified by radiative cooling, ormation is due to turbulent convection. Work on dissipation is described, including aircraft nd radiosonde studies, which showed a linear increase of temperature and decrease of turbuence with height above cloud top. Heat flux and loss are calculated; cloud and air below it varm by 0.4°C during day and cool by 2.2°C at night. Cloud loses water by turbulent iffusion upwards. Dissipation was next considered, and a few hints to forecasters given. A ood discussion followed (p. 239–241). *Subject Heading:* **1. Stratocumulus.**—*C.E.P.B.*

9.1–250 551.576.11:629.135.2

Great Britain. Naval Weather Service, **Exhaust condensation trails.** Its *Memo*, No. 57/57, **1957.** 24 p. 6 figs., 2 fold. diagrams, 6 tables, 10 refs., 19 eqs. Mimeo.—The "trail" s the whole region of the atmosphere permeated by exhaust products, the "contrail" those arts in which condensation or sublimation has taken place. Sec. 1 gives a general description f the contrail problem and summary of the present position. Sec. 2 gives instructions for a

graphical solution, the basic equations for which are given in Sec. 3. Sec. 4 gives partial summaries and comments on some of the main papers on exhaust contrails. *Subject Heading:* **1. Condensation trails.**—*C.E.P.B.*

9.1–251 551.576.11:778.3

Harding, J., **Photographs of cumulonimbus tops.** *Meteorological Magazine*, London, 86(1022):243–245, Aug. **1957.** 2 photos. **DWB**—B. W. Crocker flying north over Shetland Islands on Jan. 9, 1957, observed CuNb tops each surrounded by a ring of cloud spreading out at or below tropopause. D. A. Hammatt photographed convection cloud over Atlantic west of Biscay on Jan. 23, 1957. *Subject Headings:* **1. Cumulonimbus development 2. Cloud photography. I. Crocker, B. W. II. Hammatt, D. A.**—*C.E.P.B.*

9.1–252 551.576.11:778.3

Poulter, R. M., **Pileus before cumulus.** *Meteorological Magazine*, London, 86(1022):245, Aug. **1957.** 2 photos. **DWB**—Photos of pileus cloud at Stanmore May 27, 1957. Small Cu formed under pileus at 5000–6000 ft below an inversion. *Subject Headings:* **1. Cumulus cloud development 2. Cloud photography.**—*C.E.P.B.*

PRECIPITATION

See also: **Precip.-runoff relationships** (Harrold), 9.1–263.

9.1–253 551.577:599.9

Levert, C., **Hoe nat word ik in de regen?** [How wet will I get in the rain?] *Hemel en Dampkring*, The Hague, 54(2):34–39, Feb. **1956.** 3 figs., numerous eqs. **DWB, DLC**—Mathematical formulas are derived to determine whether one's speed should be increased in order to get wet as little as possible. The solution of the problem is a simplification of that given by J. W. Rizika, *American Scientist*, 1950, 38:247 (*see* 2.1–138, Jan. 1951, *MAB*). Both theoretical and numerical solutions are presented. *Subject Heading:* **1. Rain penetration into clothing.**—*I.L.D.*

9.1–254 551.577.2(72)

*Wallén, C. C. **Some characteristics of precipitation in Mexico.** *Geografiska Annaler*, Stockholm, 37(1/2):51–85, **1955.** 19 figs., 3 tables, 10 refs., 8 eqs. **DLC**—After discussing the nature of available precipitation data in Mexico and briefly the regional characteristics of precipitation including mean annual rainfall and rainfall provinces of Mexico, the author investigates the fluctuation of Mexican rainfall, its variability including the variability of annual rainfall and causes of its variability, the frequency distribution of rainfall amounts, and the relation between agriculture and rainfall amounts. The data are presented in tables and in the form of isoline charts. *Subject Headings:* **1. Precipitation in Mexico 2. Rainfall variability 3. Mexico.**—*I.L.D.*

9.1–255 551.577.2(436)

*Steinhauser, F., **Flächenanteil bestimmter Niederschlagsstufen in Oesterreich.** [Spatial distribution of specified precipitation amounts in Austria.] *Wetter und Leben*, Vienna, 7(8/11):261–262, **1955.** 2 refs. **DLC**—Using the latest precipitation map of Austria, the author measured with a planimeter, the areas enclosed by individual isohyets thereby measuring the average total precipitation amounts in the individual states of the Republic. A table gives the percent areal distribution of individual precipitation ranges. *Subject Headings:* **1. Areal precipitation distribution 2. Austria.**—*I.L.D.*

9.1–256 551.577.21

Favrot, Claude, **Les précipitations dans le département du Rhône.** [Rainfall in the Rhone Dept.] *Revue de Géographie de Lyon*, 31(4):329–338, **1956.** fig., table, 3 foot-refs. **DWB**—As an extension of the charts by M. Sanson in *Météorologie Nationale, Mémorial*, No. 30, pub. 1945, the author draws isohyets for the Dépt. du Rhône, based on data for 65 stations (listed and described in detail). Influence of orography and distance or exposure to Atlantic and

Mediterranean sources, and of elevation are discussed. *Subject Headings:* **1. Isohyetal charts 2. Topographic effects 3. Rhone Dept., France.**—*M.R.*

9.1–257 551.577.37:551.579.1(426)

Watkins, L. H., **Rainfall and run-off. An investigation at Harlow New Town.** *Institution of Municipal Engineers, London Journal*, 82(8):305–316, **1956.** 9 figs., 4 tables, 3 refs. **DLC** (TA1.I73)—A catchment area, 5270 acres of clay and gravel, 120–360 ft. a.s.l., was investigated with 3 rainfall and 1 runoff recorders. Twelve storms in 1950–53 were analyzed. Theoretical runoff is compared with recorded runoff, soil moisture deficit and variable impermeability factor. The area/time diagram method of calculating runoff gave good agreement with recorded runoff, but it was necessary to correct for storage. The Lloyd-Davies method of calculation gave inaccurate results. *Subject Headings:* **1. Rainfall runoff 2. Runoff evaluation 3. Harlow, Eng.**—*C.E.P.B.*

RAIN AND SNOW

9.1–258 551.578.11:551.577.37

Keizer, J. H., **Observation of a coalescence shower at Eindhoven airfield.** *Weather*, 12(9):283–285, Sept. **1957.** 2 figs., table, 4 refs. **DWB**—On July 9, 1956, a thermal low developed over N.W. Europe and caused heavy showers and thunderstorms over Holland. Brussels tephigram showed a very unstable lapse rate from 4000 to 6000 ft. At 1015 and 1155 local time showers of few but large raindrops fell from StCu; the tops were below freezing level and drops were probably formed on giant nuclei from Limburg mining area. *Subject Headings:* **1. Rain from nonfreezing clouds 2. Eindhoven, Netherlands.**—*C.E.P.B.*

9.1–259 551.578.41:551.574.1

†Montmory, R., **L'épitaxie et la nucléation de l'eau surfondue.** [Epitaxis and nucleation of super-cooled water.] *Puy de Dôme. Observatoire, Bulletin*, No. 4:108–124, Oct./Dec. **1955.** 10 figs., tables, 51 refs. **DWB**—Ice forming nuclei are classified according to types of crystal structure, using the Royer-Friedel crystallography hypothesis. It is evident now that the early VONNEGUT (1947) theory that growth of ice crystals on AgI or PbI_2 occurred because of similarity of structure of these substances to that of ice, must be abandoned since HOSLER (1951) discovered that $AgNO_3$ and Ag_2S would also serve as freezing nuclei (*see* 6F–112, June 1955, *MAB*) even though noncrystalline in structure, but because of polarizable ions. The geometry of the process of attachment of various crystalline substances on mica or of ice on freezing nuclei comprises the bulk of the paper. Observations of the critical temperatures for formation of ice on various types of crystals according to different authors are tabulated and studied. *Subject Headings:* **1. Ice crystal growth 2. Nucleation of supercooled water.**—*M.R.*

9.1–260 551.578.41:551.501.81:551.576.7

Wexler, Raymond and Austin, Pauline M., **Radar signal intensity from different levels in steady snow.** Massachusetts Institute of Technology. Dept. of Meteorology Contract DA-36-039-Sc-42625, Research Report, No. 23, March 1, **1954.** 27 p. 16 figs. (incl. photos), 8 refs., 10 eqs. **DWB** (MO1.81 M414w)—Studies of the growth of snow crystals in clouds were made by deduction from measurements of the radar echo from snow at various levels, from Jan. to April 1953 during 8 days of widespread, continuous precipitation. In continuous light to moderate precipitation (4 cases) "the snow crystals grow in an atmosphere supersaturated with respect to ice but not with respect to water, and consume all the water vapor made available by the updraft from the cloud top down to about the −3°C level." In cases of heavy precipitation, the snowflakes did not fall because of strong updraft, and layers of rapid growth 1000–2000 ft deep were observed at high levels, probably indicating growth of snow crystals in a supercooled water cloud. *Subject Headings:* **1. Snow crystal growth 2. Cloud physics 3. Radar snow formation studies.**—*M.R.*

9.1–261 551.578.46:551.501.89:551.507.352

*Kopanev, I. D., **Ob issledovanii snezhnogo pokrova aerovizual'nym metodom.** [Snow-cover investigations by means of the aerovisual method.] *Leningrad. Glavnaia Geofizi-*

cheskaia Observatoriia, Trudy, 61(123):85–91, **1956.** 2 figs., 3 tables, 7 refs. **DWB**—Experiments of visual observation of the snow cover carried out from low flying airplanes during the period of snow melting over a fixed route in Leningrad and Novgorod Regions in April 1955 have proven to be successful; they give a rather true picture of the state of the snow cover. The results were verified by ground observations. *Subject Headings:* **1. Snow cover observation 2. Airplane snow cover reconnaissance 3. U.S.S.R.**—*A.M.P.*

9.1–262 551.578.46:551.521.14

Takahashi, Yoshihiko; Soma, Seiji; Nemoto, S. et al., **Observations and a theory of temperature profile in a surface layer of snow cooling through nocturnal radiation.** *Seppyo (Snow and Ice)*, Tokyo, 18(2):43–47, Aug. **1956.** 8 figs., table, 5 refs. In Japanese; English summary p. 43. **DWB**—Temperature profile and its change with time in a snow surface layer cooling through nocturnal radiation is measured by thermometers of minute thermistor elements (Fig. 1). Thermal diffusivity is calculated from the change with time of temperature profile by TAKAHASHI's graphical method of solution for the problems of heat conduction (Fig. 3), and the value of 0.00276 cm^2/sec is obtained (measured snow density is 0.15). The lowest temperature is observed at a depth of about 0.7 cm under the surface (Fig. 5). This feature of the profile is attributable to semitransparency of snow layer, and is also demonstrated theoretically, assuming that radiation takes place in the snow layer down to a certain depth (Fig. 7). In the case when heat transfer between snow and air is small due to weak turbulence of air the surface of snow is kept at the lowest temperature. The compensation for the remarkable temperature fall of the snow surface layer (Fig. 8) will be discussed later. *Subject Headings:* **1. Snow surface temperatures 2. Radiation penetration in snow 3. Nocturnal radiation. I. Miyata, Y. II. Tokuue, H. III. Kudo, T.**—*Authors' abstract.*

HYDROMETEOROLOGY

See also: **Water for industry** (A.A.A.S.), 9.1–1; **Soil moisture meter** (Wm. B. Johnson Assoc., Inc.), 9.1–144; **Soil moisture instruments** (Kreutz), 9.1–145; **Evaporation and water need** (Gabites), 9.1–238; **Evaporation from soil** (Haude), 9.1–239; **Rainfall runoff** (Watkins), 9.1–257.

9.1–263 551.579.1:551.577

*Harrold, Lloyd L. (*Soil and Water Conservation Res. Station, U. S. Dept. of Agric., Coshocton, Ohio*), **Minimum water yield from small agricultural watersheds.** *American Geophysical Union, Transactions*, 38(2):201–208, April **1957.** 9 figs., 3 tables, ref. **DWB, DLC**—This paper presents methods of analyzing and reporting data on minimum runoff from small agricultural watersheds of 29 to 17,540 acres near Coshocton, Ohio. From 18 yrs of field records of precipitation and runoff, a relationship was established to provide a means of estimating, from a 46-yr precipitation record, 12-month minimum runoff values for recurrence intervals of two to 100 yrs for this watershed size range. The actual 18-yr field records of runoff were used to develop minimum runoff values for periods of one to 12 months. Seasonal occurrence of the four lowest values and the duration of minimum flow throughout the period of record were developed. Minimum five-day stream flow for months of June, July and Aug. for each year of record is shown. This paper does not attempt to present all the results of this study as the data would be too voluminous. Sufficient data are shown to illustrate the methods used. *Subject Headings:* **1. Minimum runoff 2. Precipitation-runoff relationships 3. Runoff data 4. Coshocton, Ohio.**—*Author's abstract.*

9.1–264 551.579:628.1

King, W. B. R., **Water supply and geology.** *Science Progress*, London, 45(180):609–618, Oct. **1957.** 4 figs. **DWB**—Water supply usually comes from upland catchment reservoirs, intake from a river or underground aquifer. The source of the last is mainly rainfall. Loss is divided into evaporation, runoff and percolation; measurement of each of these is considered in connection with geological structure. Watertable and flow of springs vary through the year and from one year to another. Artesian wells and sand layers with fresh above salt water are finally discussed. *Subject Heading:* **1. Water supply.**—*C.E.P.B.*

9.1–265 551.579.4:631.67(624)

Hartung, Fritz, **Das Wasser im alten und neuen Ägypten.** [Water in old and new Egypt, Pt. 1–2.] *Naturwissenschaftliche Rundschau*, 10(9 and 10):342–348, 373–378, Sept., Oct. 1957. 21 figs. **DWB**—Nile flood system is described. Effective life can be carried on only in the "green belt," which occupies 27,000 km² or 3% of Egypt. In the days of the old Pharaohs the flood simply overflowed the land and there was only one harvest. Taxation depended on flood level, but there was much cheating. Pumps were installed from 1860. The regulation of Lake Moeris, regulation of outflow from Assuan dam, and control of silt, are discussed. Plans are still being made for extension of dams. *Subject Headings:* **1. Irrigation 2. Egypt.**—*C.E.P.B.*

9.1–266 551.579.5:551.508.79

*Lauscher, Friedrich, **Einfache Mittel zur Bestimmung der absoluten und relativen Feuchtigkeit des Bodens.** [Simple mean for estimating the absolute and relative moisture of the soil.] *Wetter und Leben*, Vienna, 8(5/7):116–123, **1956.** 7 tables, ref. **DWB**—The carbide method (using the "C-M-Apparatus" of the firm of Riedel de Hach Seelze, near Hannover) for determining rapidly the soil moisture content is described briefly (*see Wetter und Leben*, 7, 1955, H. Heigel; *see* 8.11–247, Nov. 1957, *MAB*). This is followed by a more detailed study of this technique in order to clarify the chemical reactions involved and to devise a more simple way to determine the moisture content, soil content and air of any soil sample. The detailed procedure of preparing a soil sample for a test, the chemical reactions in the case of water deficiency and excess and the results of tests of three soil samples (meadow soil, forest soil and soil from an oat field) are described and data are given on soil moisture, soil volume and air content. *Subject Headings:* **1. Soil moisture determinations 2. Soil moisture instruments.**—*I.L.D.*

CLIMATOLOGY AND BIOCLIMATOLOGY

CLIMATE OF PARTICULAR PLACES

See also: **Climatic charts of Israel,** 9.1–36; **Bibliog. on climatology of Europe** (Edelman), 9.1–77.

9.1–267 551.582:711

Öllinger, H. (*Klagenfurt*), **Die Verwertung klimatischer Erkenntnisse in der Landesplanung.** [The use of climatological concepts in regional planning.] *Wetter und Leben*, Vienna, 7(8/11):270–274, **1955.** 3 refs. **DLC**—The author discusses the relationship of climatic characteristics to land utilization, the importance of various stages of forest vegetation in the mountainous part of the Wolfsberg district (Carinthia), applied climatology in health resort planning in the vicinity of the Wörthersee, applied climatology and settlement planning and applied climatology and transportation planning. *Subject Headings:* **1. Applied climatology 2. Land utilization 3. Health resorts 4. Regional planning 5. Austria.**—*I.L.D.*

9.1–268 551.582.1:551.573(679)

*Espirito Santo, Tomás Rebelo, **Ensaio para o estudo do clima da Província: aplicação da nova classificação de Thornthwaite.** [Experiment in the study of the climate of the Province (of Mozambique): application of Thornthwaite's new classification.] Lourenço Marques, Imprensa Nacional de Moçambique, **1955.** 45 p. 3 figs., 9 maps (fold.), 6 tables, 30 refs. At head of cover: Província de Moçambique, Serviço Meteorológico.—An elaborate monograph based on computed potential evapotranspiration (obtained from temp., precip. and humidity data for 1901–30 for the dense network of stations and posts in Mozambique), according to Thornthwaite's "new" classification system. Theory and methods are described, numerous tables give values of elements (some of which are presented graphically to show seasonal variations), and a number of large folded charts show isarithms of potential evapotranspiration, thermal efficiency, temp., precip. and a classification according to the above system and according to humidity alone, to water excess, and to water deficiency.

Subject Headings: **1. Climate of Mozambique 2. Potential evapotranspiration charts 3. Thornthwaite's classification 4. Mozambique.**—*M.R.*

9.1–269 551.582.2(459)

†*Pinna, Mario, **Il clima della Sardegna.** [Climate of Sardinia.] *Pisa. Universitá. Istituto di Geografia, Pubblicazioni*, No. 1, **1954.** 86 p. 15 figs., tables, foot-refs., bibliog. (47 refs.). **DWB** (M82.2/459 P656c)—A nice little monograph on the climatic factors (topography, air masses, insularity), the temperature, pressure, winds, humidity, cloudiness, evaporation, precipitation, aridity index, climatic types and vegetation of Sardinia. Extensive tables, some showing frequencies (e.g., of annual and seasonal winds from 16 directions), and diagrams, charts, graphs, etc. accompany the text. *Subject Headings:* **1. Climatic data 2. Climate of Sardinia 3. Sardinia.**—*M.R.*

9.1–270 551.582.2(71)

*Canada. Meteorological Division, **Climatic summaries for selected meteorological stations in the Dominion of Canada, Vol. 1, Average values of mean and extreme temperature, mean and extreme humidity, sunshine, precipitation.** Toronto (**1947?**). 63 p. almost entirely tables. Also its: **Addendum to Vol. 1,** issued **1954.** 29 p. almost entirely tables. **DWB** (M82.2/71 C212c)—The climatic tables present the following data: monthly and annual averages of daily maximum, minimum, and mean temperatures, average and extreme values of dewpoint with corresponding values of air temperature at fixed hours, monthly and annual averages of extreme highest and lowest temperatures, average monthly and annual precipitation in inches, average monthly and annual snowfall in winter, average monthly and annual number of days with measurable rain and snow and monthly and annual duration of bright sunshine in hours. The supplement includes data on temperature and precipitation for stations in the Northwest Territories, the Yukon Territory and Newfoundland (including Labrador) and for stations from which data were previously unpublished. *Subject Headings:* **1. Climatic summaries 2. Northwest Territories, Canada 3. Yukon Territory, Canada 4. Newfoundland, Canada.**—*I.L.D.*

CLIMATIC CHANGES

See also: **Quaternary glaciation** (Charlesworth), 9.1–12; **Knife Creek glaciers** (Muller, Coulter), 9.1–90.

9.1–271 551.583.13:523.746(43)

Dammann, W., **Zum Problem rezenter Klimaschwankungen in Westdeutschland und ihres möglichen Zusammenhanges mit der Sonnenfleckenwelle.** [The problem of recent climatic oscillations in West Germany and their possible connection with the sunspot wave.] *Meteorologische Rundschau*, 10(4):113–119, July/Aug. **1957.** 8 figs., 2 tables, refs. **DWB**—Numbers of ice, frost, frost change and summer days in N. and S. Germany 1890–1956 are compared. Overlapping 5-year means of frost and ice days agree with sunspot curve at first, but after 1920 run opposite to it. Relations with summer days are less clear. Pressure differences between maxima and minima of 11-year sunspot cycle (5 yr sums, units 1/24 mm) in winter ranged from +40 in S.W. Ireland and N.W. Russia to −15 in Syria. In summer differences were from +10 in Iceland and France to −20 in N.W. Russia. This represents a northward movement in winter of Icelandic Low and Azores and Russian Highs and explains increase of frost days at spot maxima at first and decrease later. The cause is a small change in the radiation balance of the earth, which is magnified in the atmosphere. *Subject Headings:* **1. Climatic variations 2. Sunspot cycles 3. Germany.**—*C.E.P.B.*

9.1–272 551.583.3(94)

Browne, W. R., **Pleistocene glaciation in the Commonwealth of Australia.** *Journal of Glaciology*, 3(22):111–115, Oct. **1957.** 3 figs., 3 photos, 3 refs. English and German summaries p. 111. **DWB**—Pleistocene glaciation in the Commonwealth of Australia is confined to Tasmania and a small area on the mainland, chiefly in the Kosciusko plateau of New South Wales. Three glacial stages of decreasing intensity have been recognized—the Malannan Yolande and Margaret Stages. These are characterized by ice cap, valley glacier and cirque

conditions, respectively. At its maximum the ice cover extended down to sea-level in western and southern Tasmania, but in New South Wales traces are not known below 1448 m. From consideration of snow line, etc. it is estimated that during the maximum glaciation the temperature was about 13°F (7.2°C) lower than it is to-day. *Subject Headings:* **1. Ice ages 2. Australia.**—*Author's abstract.*

9.1–273 551.583.3

Gill, Edmund D. (*National Museum of Victoria*), **The Australian "arid period."** *Australian Journal of Science*, Sydney, 17(6):204–206, June **1955.** fig., 23 refs. **DLC**—The world climate and the Australian climate in postglacial time are summarized briefly and the dating of the postglacial thermal maximum in Australia, the intensity of the thermal maximum in southeastern Australia and the relationship between thermal maximums in Australia and eustatic sea level are discussed. *Subject Headings:* **1. Postglacial climates 2. Postglacial drought period 3. Australia.**—*I.L.D.*

9.1–274 551.583.3(429)

Seddon, Brian, **Late-glacial cwm glaciers in Wales.** *Journal of Glaciology*, 3(22):94–99, Oct. **1957.** 3 figs., table, 11 refs. English and German summaries p. 94. **DWB**—A map of Carnarvonshire is given showing cwm glaciers on Snowdon, Glyder and Carnedd groups. Polar diagrams show occurrence primarily on north and east sides of mountains. Some are pre-Allerød and some post-Allerød. Lowest moraine on Snowdon group is at 900 ft, on Glyder at 1300 ft and on Carnedd at 1600 ft, indicating heaviest snowfall in the west, as to-day. *Subject Headings:* **1. Ice ages 2. Wales.**—*C.E.P.B.*

MICROCLIMATOLOGY

See: **Sand dune microclimatology** (Salisbury), 9.1–29; **Micrometeorological instrumentation** (Platt), 9.1–134.

CLIMATIC CLASSIFICATION

9.1–275 551.585:551.44

Saar, R. (*Vienna*), **Zur Klimatologischen erforschung der Karsthochflächen.** [Climatological investigation of karst plateaus.] *Wetter und Leben*, Vienna, 7(8/11):263, **1955. DLC**—The role of climatic elements in karst formation in Petzeukirchen and Gurgel (Austria) is discussed briefly with special reference to that of the radiation balance, precipitation, runoff and retention. *Subject Headings:* **1. Climatic effects 2. Karst 3. Austria.**—*I.L.D.*

91–276 551.585.7(411)

Penman, H. L., **Hill climate.** *Nature*, London, 180(4586):574–576, Sept. 21, **1957. DWB**—At Roy. Met. Soc. meeting at Glasgow July 4–5, 1957, R. Cranna opened a discussion with **Problems of hill climate.** There is only one station at 1250 ft, and there are other deficiencies. R. W. Gloyne discussed vertical irregularities, and climate and plant growth. Length of growing season is 242–4.4 *H* days (*H* in 100 ft). D. H. N. Spence outlined ecological work in Shetlands, Rhum and central Highlands. C. A. Halstead described soil slip and P. A. Baird observations on Ben Macdhui at 4120 ft. *Subject Headings:* **1. Hill climates 2. Scotland.**—*C.E.P.B.*

BIOCLIMATOLOGY

See also: **Climate and vegetation zones** (Daubermire), 9.1 (20); **Arctic plant growth** (Wilson), 9.1–58; **Weather and plant growth** (Schrodter), 9.1–103; **Weather and lung diseases** (Bellan), 9.1–104; **Weather effects on wheat harvest** (Berenyi), 9.1–105.

9.1–277 551.586:581.143.26

Koch, Horst-Günther, **Jahresringauszählungen an Waldbäumen zum Nachweis witterungsbedingter Zuwachsschwankungen.** [Counting annual rings of conifers to show growth variations due to weather conditions.] *Annalen der Meteorologie*, 8(1/2):21–33, **1957.** 5 figs.,

5 tables, 4 refs. **DWB**—Twenty-five year counts of annual rings of spruce and pine on Thuringia Mountains made possible a treatment of differences of radiation warmth due to aspect and height a.s.l. Spruce depends more on weather, pine on climate. Below about 500 m in dry locations and 650 m in moist ones there is a good relation between growth and rainfall; 500–650 m no relation, above 650 m an inverse one, transition being at a greater height on windward than leeward sides. At lower heights rainfall, at greater heights temperature is the limiting factor. Hence spruce grows best on S. slopes above 600 m and at lower levels on N. slopes. *Subject Headings:* **1. Tree rings 2. Thuringia.**—*C.E.P.B.*

9.1–278 551.586:633.1

*Nuttonson, Michael Y., **Comparative study of lower and upper limits of temperature in measuring the variability of day-degree summations of wheat, barley and rye.** Study sponsored by U. S. Weather Bureau Contract Dwb-8737. Wash., D. C., American Institute of Crop Ecology, **1956.** 42 p. 31 tables. **DWB** (M86:633.1 N988c)—Five bases (32°, 36°, 40°, 45° and 50°F) and 3 upper limits (80°, 78° and 76°F) and "no upper limit," were used in calculating degree-days to correlate with phenological data for winter wheat, barley and rye, and spring wheat and barley for Kansas, Nebraska, N. Dakota and Alberta stations. For winter grains, 32°F or 40°F proved to be most reliable base. No satisfactory conclusions regarding upper limits could be drawn from this study, except for spring cereals, since winter cereals mature before high temperatures are frequent. Data are presented *in extenso* for individual stations and events. *Subject Headings:* **1. Phenological studies 2. Degree-days and cereal growth 3. Grain crops 4. Agricultural climatology 5. Plains States.**—*M.R.*

ENVIRONMENTAL INFLUENCES

See also: **Forest influences on precip.** (Paszyński), **9.1–107.**

9.1–279 551.588.4

Kakas, József, **A Balaton-kutatás éghajlati kérdései.** [Climatic problems of research on Lake Balaton.] *Időjárás*, Budapest, 60(5):305–307, Sept./Oct. **1956. DLC**—In connection with the re-establishment of an Administrative Committee for Lake Balaton, charged with promoting the development of the area, the author stresses the importance of meteorological research in that region. Such research should comprise: a) investigation of the lake-shore and inland climate by the method of descriptive climatology and b) synoptic climatological investigation of the atmosphere over the lake and its vicinity. Results of such research should be applied to storm warning, daily radiation forecasting, forecasting of sailing conditions and selection of sites for health resorts. The research program would necessitate establishment of new stations including a fast moving weather ship. *Subject Headings:* **1. Climatic research 2. Descriptive climatology 3. Lakes and climate 4. Lake Balaton, Hungary**—*G.T.*

MISCELLANEOUS

COSMIC INFLUENCES

See also: **Sunspot effects on Takata reaction** (Kohler), **9.1–211**; **Sunspot effects on climatic changes, Germany** (Dammann), **9.1–271.**

9.1–280 551.590.25:621.396.

Bowden, K. R. R. and Davies, J. G., **The time distribution of meteors.** *Journal of Atmospheric and Terrestrial Physics*, 11(1):62–66, **1957.** 3 figs., table, 7 refs., 6 eqs. **DWB**—Four records of pulsed radio echoes (over 3000) on 72 and 36 Mc/s at Jodrell Bank were analyzed by 4 methods. The meteor echo rate has a diurnal and annual variation. The number of echoes in half-minute periods, and intervals between successive echoes, show no significant departure from a random distribution. No evidence was found that meteors enter the atmosphere in groups. *Subject Heading:* **1. Meteor echoes.**—*C.E.P.B.*

9.1–281 551.590.25

Van Diggelen, J., **De vuurbol van 17 November 1955.** [The fire ball of Nov. 17, 1955.] *Hemel en Dampking*, The Hague, 54(7/8):133–138, July/Aug. **1956.** 7 figs. **DWB, DLC**—This fire ball was reported to have been observed over much of Western Europe as well as in the Netherlands. A composite picture of the phenomenon based on numerous reports is described with the aid of illustrations. Its position in the sky, its characteristics and path are described with reference to a consideration of wind velocities and with photographs and map. *Subject Headings:* **1. Fire balls 2. Netherlands.**—*I.L.D.*

VISIBILITY

See: **Vision through the atmosphere** (Middleton), 9.1–25.

OPTICAL PHENOMENA

See also: **Light scattering** (van de Hulst), 9.1–7; **Noctilucent cloud obs. during IGY** (Krivsky), 9.1–55; **Twilight luminescence** (Sholokhova, Frish), 9.1–203.

9.1–282 551.593.5:551.593.6

Balaster, Gian Andrea, **Theorie des Regenbogens und der Kranzerscheinung auf elektromagnetischer Grundlage.** [Theory of rainbow and corona phenomena from the electromagnetic point of view.] Zürich, **1951.** 34 p. Thesis (Ph.D.)—Zürich Univ. figs., eqs., ref. p. 32–34. Biographical note, following p. 34. **DLC** (QC976.R2B3)—A detailed mathematical and graphical treatment of the theory of rainbows, coronas and halos, based on optical theory of scattering of light by spherical particles. The theory goes back to AIRY (1838) for rainbows and FRAUNHOFER (1824) for coronas, and WIENER (1907–9) for the geometrical theory of scattering and MIE (1908) for the electromagnetic theory. *Subject Headings:* **1. Optical theory 2. Rainbow theory 3. Corona theory.**—*M.R.*

9.1–283 551.593.51

Franklin, A. L. and Bull, G. A., **Green flash.** *Weather*, 12(8):265–266, Aug. **1957.** **DWB**—FRANKLIN describes two brilliant green sunsets in Australia. BULL discusses two observations of green flash from airplanes and supports the idea that it is more likely to be seen when the air is warmer than the surface from which the sun rises or into which it sets. *Subject Heading:* **1. Green flash.**—*C.E.P.B.*

9.1–284 551.593.63

Poncelet, L., **A propos d'un parhélie exceptionnel.** [An exceptional parhelion.] *Ciel et Terre*, 71(1/2):9–14, Jan./Feb. **1955.** 6 refs. **MH-BH**—The rare occasion of a 46° parhelion is described with an analysis of simultaneous weather conditions. An account of eye witnesses is given and some corresponding literature information summarized. *Subject Headings:* **1. Parhelia 2. Optical phenomena.**—*A.A.*

ELECTRICAL PHENOMENA

See also: **Atmospheric elec. conf.**, 9.1–3; **Radio propagation symposium** (Wait), 9.1–5; **Atmospheric elec.** (Chalmers), 9.1–6; **Franklin's electrical experiments** (Dorfman), 9.1–69; **Satellite determination of ionospheric electron density** (Berning), 9.1–91; **Satellite ionosphere electron density measurement** (Hok et al.), 9.1–95; **Ionization gradients in atmosphere** (Banerjee, Surange), 9.1–174; **Instrumentation for determination of ionospheric electron density** (Haycock), 9.1–176; **Ionospheric temp. effects** (Akasofu), 9.1–215; **Atmos. elec. and condensation nuclei, Jungfraujoch** (Herpertz et al.), 9.1–242.

9.1–285 551.594.13:551.506.7

Mühleisen, Richard, **Zur Auswertung von Radiosondenmessungen der elektrischen Feldstärke und der Leitfähigkeit in der freien Atmosphäre.** [On the analysis of radiosonde

measurements of the electrical field strength and conductivity in the free atmosphere.] *Annalen der Meteorologie*, 8(1/2):11–15, **1957.** 7 figs., 8 refs. **DWB**—Examples of radiosonde measurements to 100 mb at Uccle and Libenge, and electrical conductivity, are shown. Conductivity gives information about particle content of the atmosphere. Electrical field strength is inversely proportional to conductivity so long as suspended particles are not unipolar and have no motion relative to surrounding air. The stratosphere is especially suitable for measurements of atmospheric electricity layers with different particles being discovered or measured. *Subject Headings:* **1. Atmospheric electricity 2. Radiosonde electrical conductivity soundings 3. Uccle, Belgium 4. Libenge, Belgian Congo.**—*C.E.P.B.*

9.1–286 551.594.221:634.94

Defandorf, Francis M. (*Nat. Bur. of Standards*), **A tree from the viewpoint of lightning.** *Washington Academy of Sciences, Wash., D. C., Journal*, 45(11):333–339, Nov. **1955.** 2 figs., 6 refs. **DLC**—A tree makes a good conductor for lightning whether wet or dry. Resistance and other electrical characteristics of a synthesized tulip tree 25 m high are shown in model. Leaves have a resistance 6 times as high as the entire woody portion of the tree from the base of the leaf to the ground. The mechanism of discharge from a tree when a thundercloud passes over is shown in diagram and discussed. The efficiency of a tree as a lightning shelter varies with distance from base of tree in a complicated manner. At about a 45° to a 60° angle (cone of protection) the protection is greatest; closer to the tree the risk of high voltage discharges from one foot to the other through the body is greater; farther from tree the risk of a direct stroke or a ground current from a nearby stroke to ground is greater. Cows standing radially from a tree were killed when cows standing tangentially were not, showing that the distance between legs is important. Best position to maintain under a tree is to stand on one leg or the other. *Subject Heading:* **1. Lightning strokes to trees.**—*M.R.*

AURORAS

See also: **Auroral instruments** (Jacka, Ballantyne), **9.1–147.**

9.1–287 551.594.51

†Seaton, M. J. (*Institut d'Astrophysique, Paris*), **Excitation processes in the aurora and airglow. Pt. 3, Low-latitude aurorae.** (In: **The airglow and the aurorae: a symposium.** London, Pergamon, **1956.** p. 225–243. 2 figs., 9 tables, 45 refs., 17 eqs.) **DWB**—The paper is concerned with the type of world-wide auroral activity observed on rare occasions at geomagnetic latitudes as low as 20–30°. Both ionospheric and auroral observations show that, although there are some low-level effects, the phenomena of principal interest occur at very great heights ($\geq$200 km). Ionosphere observations show that $n(e/F)$ drops far below normal. The residual ionization is very high, very patchy and spread out and shows rapid movements. The main low-latitude spectral characteristics are: great strength of the N_2+ negative group; great enhancement of the [O I] red lines; some enhancement of the [O I] green line; presence of [N I] λ5199. It is shown that the N_2+ emission is due to resonance in the sunlit atmosphere. The mean N_2+ density is estimated to be $\bar{n}(N_2+) \simeq 300$ cm^{-3}. Even at heights $\geq$740 km, $\bar{n}(N_2+)$ is sometimes $\geq$120 cm^{-3}. The electron density is estimated to be 10^3–10^4 cm^{-3}. It is considered that the forbidden lines are excited by fast electrons produced in high atmosphere current systems. The parameter E(=field strength times Wean free path) being estimated to be of order 1 eV from the [O I] red/green intensity ratio, the absolute [O I] red-line intensity is calculated and found to be in good agreement with observation. Current densities indicated are 10^{10}–10^{11} electrons cm^{-2} sec^{-1}, giving an integrated current of order 0.06 amp cm^{-1}. From the ratio of [N I] to [O I] intensities it is estimated that $n(N)/n(O) \simeq 0.15$ in the emission region. All numerical results refer to the aurora of Sept. 18–19, 1941. *Subject Headings:* **1. Low latitude auroras 2. Auroral energy excitation mechanism.**—*Author's abstract.*

9.1–288 551.594.5

Percival, I. C. and Seaton, M. J. (*both, Dept. of Physics, Univ. College, London and Institut d'Astrophysique, Paris*), **Excitation processes in the aurora and airglow. Pt. 4, On the excita**

ion of permitted O I lines in high-latitude aurorae. (In: **The airglow and the aurorae: a symposium.** London, Pergamon, **1956.** p. 244–248. table, 15 refs., eqs.) **DWB**—Excitation mechanisms are discussed for the [O I] lines $3p\ ^5P \rightarrow 3s\ ^5S$, λ7774 and $3p\ ^3P \rightarrow 3s\ ^3S$, λ8446. Auroral observations give $I(7774)/I(8446)$ between 0.3 and 3.0 and $I(7774)/I(5577) \simeq 0.3$. The hypothesis is examined that $3p\ ^5P$ is excited by collisions between electrons and ground-state oxygen atoms. Using calculated excitation cross-sections it is shown that this hypothesis would lead us to expect $I(7774)/I(8446)$ to be <0.3 and $I(7774)/I(5577)$ to be $\ll 0.1$. It is concluded that the hypothesis of electron excitation is improbable. It is considered probable that the permitted [O I] emissions result from collisions producing dissociation of oxygen molecules into excited atoms. (For Pts. 1 and 2, *see* 8.3–340, March 1957; for Pt. 3, *see* 9.1–287, Jan. 1958, *MAB.*) *Subject Heading:* **1. Auroral energy excitation mechanisms.**—*Authors' abstract.*

9.1–289 551.594.52:523.74

Botley, Cicely M., **Some great tropical aurorae.** *British Astronomical Association, Journal,* 67(6):188–192, July **1957.** fig., table, 9 refs. **DLC**—A number of auroral displays in low latitudes are listed, including 12 tropical. Five coincided with strong or very strong sunspot maxima. *Subject Heading:* **1. Low latitude auroras.**—*C.E.P.B.*

SFERICS AND RADIO METEOROLOGY

See: **Radio meteorology** (Nasilov), 9.1–26; **Satellite propagation experiment** (Hartman, Haviland), 9.1–93; **Ionospheric radio wave scattering** (Banerjee, Surange), 9.1–174; special bibliography on **Radio Astronomy,** p. 72.

ACOUSTICAL PHENOMENA

9.1–290 551.596.1

†*Cox, Everett F., **Sound propagation in air.** *Handbuch der Physik,* Berlin, 48:455–478, **1957.** 15 figs., table, 7 foot-refs., bibliog. p. 477–478 (42 refs.), 10 eqs. **DWB** (551.03 N236)—Nature of sound compared with meteorological oscillations, effect of micrometeorological variables on sound, refraction, absorption and dispersion, reflection, ducts in atmosphere, blast damage, tropospheric refraction, anomalous propagation, natural oscillations of the atmosphere are discussed with supporting data in form of tables, graphs, etc. *Subject Headings:* **1. Acoustical propagation 2. Acoustical wind sounding.**—*M.R.*

PART II. COMPILATION OF RECENT LITERATURE ON RADIO ASTRONOMY

By: *Mary L. Rice*

INTRODUCTION

Radio astronomy, a new science which has developed since World War II, is concerned primarily with the production, propagation and reception of cosmic radio waves. It includes the observation and study of radio frequency radiation emanating (or reflected) from the galaxies, the sun, the planets and even meteors or clouds in the earth's atmosphere.

Meteorologists are interested in radio astronomy because solar effects on the atmosphere and ionosphere may be detected by investigation of radio frequency radiation variations.

As early as 1893, H. EBERT suggested the possibility of radio waves arising in electromagnetic disturbances in the solar corona; SIR OLIVER LODGE had a similar idea and tried unsuccessfully to detect such radiation. It was not until 1932 that JANSKY (*see* 9A–1 and 9A–2) secured the first definite evidence of measurable radio waves of extraterrestrial origin. These waves were from the Milky Way. He failed to detect similar radiation from the sun. His work laid the foundation for radio astronomy.

The war years saw a vast improvement in radio techniques which led to investigations to detect radio waves from the sun. The first successful observations were made by REBER in 1944.

In this listing we have included a few of the earlier historical papers, but the bulk of the material has been published since 1950.

It should be emphasized that this is not a systematic bibliography but merely a collection of recent material available in the *MAB* files.

The following outline shows the range of subject matter which has been included in this compilation. As a rule, articles on cosmic sources of radio frequency radiation have been excluded unless having some particular aspect which lends interest from the point of view of a radiometeorologist. Likewise, papers on radio reflections from meteors have been excluded; these were included in the August 1957 issue (p. 1109) of *MAB*.

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- Galaxy (Milky Way), 9A–2, –26, –60, –7 –135, –157, –166, –168

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1933–1935

9A–1 621.317:538.56

Jansky, Karl G., **Electrical disturbances apparently of extra-terrestrial origin.** *Institute of Radio Engineers, N. Y., Proceedings,* 21(10):1387–1398, Oct. **1933.** 9 figs., 3 refs. **DLC**—Electromagnetic waves of an unknown origin were detected during a series of experiments on atmospherics at high frequencies. Directional records have been taken of these waves for a period of over a year. The data obtained from these records show that the horizontal component of the direction of arrival changes approximately 360° in about 24 hrs in a manner that is accounted for by the daily rotation of the earth. Furthermore, the time at which these waves are a maximum and the direction from which they come at that time changes gradually throughout the year in a way that is accounted for by the rotation of the earth about the sun. These facts lead to the conclusion that the direction of arrival of these waves is fixed in space; i.e., that the waves come from some source outside the solar system. Although the right ascension of this source can be determined from the data with considerable accuracy, the error not being greater than ±7.5°, the limitations of the apparatus and the errors that might be caused by the ionized layers of the earth's atmosphere and by the attenuation of the waves in passing over the surface of the earth are such that the declination of the source can be determined only approximately. Thus the value obtained might be in error by as much as ±30°. The data given for the coordinates of the region from which the waves seem to come show a right ascension of 18 hrs and a declination of −10°. *Subject Headings:* **1. Electromagnetic waves 2. Radio waves from space.**—*Author's abstract.*

9A–2 523.874

Jansky, Karl G., **A note on the source of interstellar interference.** *Institute of Radio Engineers, N. Y. Proceedings,* 23(10):1158–1163, Oct. **1935.** 2 figs., 4 refs. **DLC**—Further consideration of the data obtained during observations on interstellar interference has shown that these radiations are received any time the antenna system is directed towards some part of the Milky Way system, the greatest response being obtained when the antenna points toward the center of the system. This fact leads to the conclusion that the source of these radiations is located in the stars themselves or in the interstellar matter distributed throughout the Milky Way. Because of the similarity in the sound produced in the receiver headset, it is suggested that these radiations might be due to the thermal agitation of charged particles. *Subject Headings:* **1. Radio waves from space 2. Milky way.**—*Author's abstract.*

1944–1946

9A–3 523.16:538.56.029.6

Reber, Grote, **Cosmic static.** *Astrophysical Journal,* 100(3):279–287, Nov. **1944.** 5 figs., 3 foot-refs., 2 eqs. **DLC**—Cosmic static is a disturbance in nature which manifests itself as electromagnetic energy in the radio spectrum arriving from the sky. The results of a survey at a frequency of 160 megacycles per second show the center of disturbance to be in the constellation Sagittarius. Minor maxima appear in Cygnus, Cassiopeiae, Canis Major, and Puppis. The lowest minimum is in Perseus. Radiation of measurable intensity is found coming from the sun. *Subject Headings:* **1. Cosmic static 2. Sagittarius.**—*Author's abstract.*

9A–4 551.521.9:523.72

Southworth, G. C., **Microwave radiation from the sun.** *Franklin Institute, Journal,* 239(4):255–297, **1945.** 5 figs., 11 refs., 3 eqs. **DLC**—Observations of the sun's radiation at 1¼ cm, 3 cm and 10 cm over a Mc band at each frequency give emissions respectively 0.3, 2.1 and 2.9 ×the black body values for 6000°K. No diurnal variation was observed. No radiation is found from the Milky Way or other celestial objects. *Subject Heading:* **1. Solar radio radiation.**—*From Physics Abstracts, No. 2450, 1945.*

9A–5 523.165:621.396.821

Hey, J. S.; Parsons, S. J. and Phillips, J. W., **Fluctuations in cosmic radiation at radio frequencies.** *Nature,* London, 158(4007):234, Aug. 17, **1946.** 3 figs., 5 refs. **DLC**—The radiation

associated with the direction of Cygnus has been found to exhibit short-period irregular fluctuations of average amplitude of 15% of the mean power received. The parallel with radio frequency radiations from sunspots is pointed out. *Subject Headings:* **1. Galactic radio radiation 2. Radio frequency radiation from sunspots.**—*Physics Abstracts, No. 2445, 1946.*

9A–6 523.72:535.231:621.396.821

Hey, J. S., **Solar radiations in the 4–6 metre radio wave-length band.** *Nature*, London, 157(3976):47–48, Jan. 12, **1946.** Note by F. J. M. Stratton, *Ibid.*, p. 48. **DLC**—Hey reports on the observation of solar radiations of the order of 10^5 times the power expected from the sun (assuming that the sun behaves as a perfect black-body radiator at a temperature of 6000° K) on Feb. 27 and 28, 1942 by radar receiving equipment working at various wavelengths in the 4–6 m band. Evidence that the disturbance was caused by electromagnetic radiations of solar origin was obtained by the bearings and elevations measured independently by receiving sets at widely separated points (Hull, Bristol, Southampton, Yarmouth). It was determined that the noise power received from the sun was of the order of 10^{-13} watt per sq. m per megacycle band-width. Stratton states that solar flares were observed on Feb. 21, 27, 28 and March 1 at Mendon; a sudden fadeout on Feb. 28, and a magnetic storm on March 1. The radio noise reported by Hey was the earliest terrestrial phenomena observed preceding the above events. *Subject Headings:* **1. Solar radio radiation 2. Solar flares.**—*M.L.R.*

1949

9A–7 621.396.8.522

Burrows, Charles R. (*Dir. School Elec. Engr., Cornell Univ.*), **Radio astronomy.** *Electronics*, Albany, N. Y., 22(2):75–79, Feb. **1949.** 5 figs., 13 refs. **DWB.** Also in: Cornell Univ. School of Electrical Engineering, Contract N6onr-264, T.O. 6, NR077–321, **Radio Astronomy** Report No. 3, Feb. **1949.** [5 p.] 5 figs., 13 refs. **DWB**—A broad informative presentation of the subject and its various aspects with the focus on radio astronomy as a useful tool for the radio engineer, the astronomer and the meteorologist. *Subject Heading:* **1. Radio astronomy.**—*W.N.*

9A–8 522.6:621.396

†Hey, J. S., **Radio astronomy.** *Royal Astronomical Society, Monthly Notices*, 109(2):179–214, **1949.** 6 figs., 3 tables, numerous refs., 8 eqs. **DLC**—A progress report outlining the fundamentals of radio transmission and reception in the m and cm bands, and discussing technique and results in the radar observation of meteor trails and of the moon, and in the investigation of galactic and solar radio noise. A full bibliography is appended. *Subject Heading:* **1. Radio astronomy.**—*Physics Abstracts, No. 1388, 1950.*

9A–9 523.75

*Mayer, H. F. (*Cornell U. Sch. of Elec. Engr.*), **Radio noise considerations.** Cornell Univ. School of Electrical Engineering, Contract W19-122 ac-41, Solar Noise Technical Report, No. 1, Aug. **1949.** 52 p. figs., eqs. **DWB**—Three reports, based on the author's lectures, are presented. The purpose is to lay the groundwork for designing and building suitable radiometers for solar noise observations. The first report is entitled "Investigations of noise statistics," in which is considered white noise as a function of frequency and time. The second report, "Limitations by noise in solar noise measurements," treats six factors upon which the minimum detectable signal depends. The third report: "Law of rectification, noise fluctuations and signal sensitivity" treats three factors with direct bearing upon the subjects under discussion. *Subject Headings:* **1. Solar radio noise 2. Radio emission.**—*W.N.*

1950

9A–10 621.396:016:019.4

Carpenter, Martha (Stahr) (*Cornell Univ.*), **Bibliography of extra-terrestrial radio noise. Issued as part of the Report of Commission V to the IXth General Assembly of the International Scientific Radio Union.** Cornell Univ. School of Electrical Engineering, Contract N60nr-26406, NR 077-321, Radio Astronomy Report, No. 11, Aug. 15, **1950.** 129 p. Also: **Supplement for 1950** . . . Radio Astronomy Report, No. 12, Aug. 1, **1952.** 63 p. **DWB**—The 280 annotated references in Report 11 and 77 items in Report 12 are classified according to: (A) Radiation from the sun, (B) General galactic radiation, (C) Radiation from "discrete source," (D) Radiation from the moon. In each section the works are divided into (1) observations and (2) theories and interpretations, and chronologically within each subsection. Also a section on miscellaneous items and one on reviews are included. Many of the abstracts are from standard journals and about half by the author. An author index is appended. Titles are given in the original language (except Russian titles which are given only in English translation). (Report 11 is *same item as* 6.9–41, Sept. 1955, *MAB.*) *Subject Headings:* **1. Radio radiation bibliographies 2. Abstracts. I. International Scientific Radio Union.**—*M.R.*

9A–11 551.521.7

Cornell Univ. School of Electrical Engineering. **Statistical analysis of solar noise observational data.** Contract W19-122 ac-41, Contract N6onr-264, T.O.6, NR 077-321, Radio astronomy and solar noise, Joint Report No. 1, May 15, **1950.** 26 p. 10 figs., 5 tables, 7 eqs. **DWB**—Solar noise data were obtained almost daily during two hours local noon time from July to Oct. 1949. Through statistical analysis, some characteristic values were deduced and are presented in distribution curves featuring the relation between the principal states of the sun (1, very quiet, 2, small activity, 3, medium activity, 4, large activity), base level, burst power and total power radiated from the sun at 205 Mc. The curves may be valuable in comparison with data of the sun's activity to be obtained at other periods of observation. *Subject Heading:* **1. Solar radio noise.**—*W.N.*

9A–12 551.521.9:621.396

Seeger, Charles L. (*Cornell Univ.*), **Observations of the variable 205 Mc radiation of Cygnus A.** Cornell Univ. School of Electrical Engineering, Contract N6onr-264, T.O.6, NR 077-321, Radio Astronomy Report, No. 8, Oct. 1, **1950.** 33 p. 5 tables, 10 figs., 8 refs. **DWB**—The first evidence of any large variation in the 205 Mc galactic radio frequency from the Cygnus region, was obtained on the night of Oct. 18, 1949. Results for some 200 nightly observations of two to ten hours duration, contradict the results as obtained by Bolton and Stanley insofar as the variation of intensity of radiation is concerned. The chief cause of variation in the flux of the incoming radiation from outer space seems to be traceable to scattering by random inhomogeneities in the earth's atmosphere (ionosphere). *Subject Headings:* **1. Galactic radio radiations 2. Ionosphere.**—*W.N.*

1951

9A–13 551.521.9:551.507.362

Carpenter, R. O'B., **Solar X-radiation.** Baird Associates, Inc., Contract W19-122 ac-23, Interim Report No. 3–8, Sept. 16, 1948–March 31, **1951.** 6 pieces. figs., tables, eqs. **DWB**—A series of detailed reports giving the results of photographic observations of solar X-radiation (2–12 Å range) with packets flown in V-2 rockets. Difficulties encountered during the numerous tests and the development of better equipment, (filters, shutters, films, etc.) and methods outlined in these progress reports, and data, diagrams, photographs, etc. are included. In the last report (No. 8) values (curves) for atmospheric transmission of 2, 5, 8 and 10 Å from 45–100 mi height are given. The results are organized in the final technical report, No. 1—June 30, 1951. *Subject Headings:* **1. Solar X-radiation 2. X-ray photography 3. V-2 rocket flights. I. Weichel, E. J. II. Hitchcock, W. J.**—*M.R.*

9A–14 551.521.6:523.7

Christiansen, W. N.; Hindman, J. V.; Little, A. G. et al., **Radio observations of two large solar disturbances.** *Australian Journal of Scientific Research, Ser. A, Physical Sciences,* 4(1):51–62, March **1951.** 6 figs., 7 tables, 4 refs. **DLC**—Two exceptionally large radio frequency disturbances of Feb. 17 and 21–22, 1950 were observed in Australia on seven frequency bands ranging from 62 to 9400 mc/sec. The time of commencement and the duration of disturbances in the various frequencies are shown graphically. The relationship to fade-outs, solar and magnetic disturbances is also discussed and illustrated by records made in Australia. *Subject Headings:* **1. Radio frequency disturbances 2. Solar flares 3. Australia. I. Payne-Scott, Rugby II. Yabsley, D. E. III. Allen, C. W.**—*W.N.*

9A–15 551.521.9:621.396:523.72

*Hagen, John P. (*U. S. Naval Res. Lab., Wash., D. C.*), **Temperature gradient in the sun's atmosphere measured at radio frequencies.** *Astrophysical Journal,* Chicago, 113(3):547–566, May **1951.** graphs, tables, foot refs. Also issued as: *U. S. Naval Research Laboratory, Report,* No. 3504. **DLC**—Intensity of radiation from quiet sun varies with radio wave length. This radiation may be treated as thermal radiation originating in coronosphere and corona. New measurements at short end of radio spectrum are analyzed and compared with measurements of longer wave lengths. Temperature determined to be fairly uniform at <10,000°K up to height of 10,000 km and then rises steeply to 1,000,000°K at 25,000 km. *Subject Headings:* **1. Solar temperature 2. Solar radio radiation.**—*From author's abstract.*

9A–16 551.521.9:621.396:523.74

Little, A. G. and Payne-Scott, Ruby, **The position and movement on the solar disk of sources of radiation at a frequency of 97 Mc/s, Pt. 1, Equipment.** *Australian Journal of Scientific Research, Ser. A, Physical Sciences,* 4(4):489–507, Dec. **1951.** 9 figs., 6 plates, refs., 13 eqs. *Ibid.*, **Pt. 2, Noise storms,** p. 508–525. 8 figs., 8 tables, plate, refs. **Pt. 3, Outbursts.** *Ibid.*, 5(1):32–46, March **1952.** 2 figs., 2 tables, plate, refs.—The spaced aerial interference technique, as used in

radio astronomy, has been modified in order to observe solar disturbances which are either of short duration or are rapidly changing in position. The interference pattern is obtained in $\frac{1}{25}$ of a second by sweeping the aerial lobe pattern across the source, 25 times per second. The position of the source and the polarization of the radiation are determined separately, a complete record taking about one second. Two different aerial spacings are used and calibration is carried out by a novel method. An equipment operating on 97 Mc/s, which has been used for observations of solar disturbances, is described and the sources of error discussed. II. Using the equipment described in Part 2 of this series, the apparent position and polarization of the sources of solar radiation at 97 Mc/s have been measured at some time during about 30 noise storms occurring between May 1949 and July 1950, and the progress of the source during about six of these has been observed in some detail. The best criterion available for the chance of a storm has been observed in some detail and is shown to be the size of the latest visible individual sunspot. The evidence suggests that storm radiation is associated with this spot only, and not with the rest of the group, that the spot magnetic field is the important factor, and that the direction of rotation of the circular polarization of the storm radiation depends on the magnetic polarity of the associated spot, being usually left-handed when the largest spot is a north-seeking pole, and right-handed when it is a south-seeking pole. Deviations observed between the apparent positions of radio source and visible sunspot on the solar disk are explained in terms of a high origin of the storm radiation in the solar corona, the observed height varying from 0.3 to 1.0 photospheric radii above the sun's visible surface. Pt. 3 discusses the measurement of the apparent position and polarization of solar radiation at 97 Mc/s. Data on the accompanying solar flares are available for five of these. Initially the apparent position of outburst and flare almost coincide. As the outburst proceeds, its position changes rapidly. The polarization in the early stages is random. *Subject Headings:* **1. Solar activity 2. Sunspots 3. Solar radio radiation 4. Radio astronomy.**—*Authors' abstracts.*

1952

9A–17 551.521.9:523.8

Brown, R. Hanbury; Jennison, R. C. and Das Gupta, M. K., **Apparent angular sizes of discrete radio sources. Observations at Jodrell Bank, Manchester.** *Nature*, London, 170(4338):1061–1063, Dec. 20, 1952. 3 figs., 2 tables, 7 refs. Also: Mills, B. Y., . . . **Observations at Sydney.** *Ibid.*, p. 1063–1064. 2 figs., 2 tables, 6 refs. Smith, F. G., . . . **Observations at Cambridge.** *Ibid.*, p. 1065. fig., table, 5 refs. **DWB**—Brown, Jennison and Das Gupta describe a new setup for accurate measurements, and first results. The source in Cygnus is irregular in shape, diameters from 35″ to 2′10″ of arc; that in Cassiopeia nearly circular, diameter 4′. Mills finds for 4 sources, diameters of 1.1 to 6′. Smith finds values for Cygnus and Cassiopeia agreeing with their visual diameters. *Subject Heading:* **1. Radio stars.**—*C.E.P.B.*

9A–18 551.521.9

Cottony, H. V. and Johler, J. R., **Cosmic radio noise intensities in the VHF band.** *Institute of Radio Engineers, Proceedings*, 40(9):1053–1060, Sept. **1952.** 8 figs., 2 tables, refs., 7 eqs. **DLC**—Diurnal, seasonal and frequency characteristics of cosmic radio noise (including both solar and galactic noise) as affecting the operation of *hf* and *vhf* radio-communication systems was investigated in continuous measurements during 1948 and 1949 at the National Bureau of Standards. Antenna and receiver used in the measurements and methods of evaluation are described. The apparatus is shown in diagrams. Sample records and tabulated data of normal cosmic noise are presented. Normal cosmic noise intensities were found to be constant. Abnormal high noise levels were observed in conjunction with unusual solar activity and are shown in transcribed records. *Subject Headings:* **1. Solar radio noise 2. Galactic radio noise.**—*G.T.*

9A–19 621.396

Froome, K. D., **A new determination of the velocity of electromagnetic radiation by microwave interferometry.** *Nature*, London, 169(4290):107–108, Jan. 19, **1952.** 5 refs. **DLC**—Velocity of 1.25 cm waves in vacuo 299,792.6 ±0.7 km/s. *Subject Heading:* **1. Radio transmission.**—*C.E.P.B.*

9A–20 551.501.8:52(02) 621.396.8:522(02)

†Lovell, A. C. B. and Clegg, J. A., **Radio astronomy.** London, Chapman and Hall, **1952.** 238 p. 120 figs., 7 tables, refs. *Frontiers of Science Series.* Also trans. into Russian by B. M. Chikhachev as **Radioastronomiia.** Moscow, Izdat. Inostrannoĭ Literatury, **1953.** 240 p. 120 figs., 7 tables, numerous foot-refs., eqs. Refs. at end of most chapters. **DLC**—After introductory chapters on astronomy and the transmission and reception of electromagnetic waves, this popular book takes up the study of meteors by radio echo, its results and significance, radio waves from the sun, sunspots and solar flares, radio waves from the galaxy, twinkling of radio stars, the aurora, radio investigation of the moon and the planets, and afterglow. The translation includes critical comments; references

re given in original form but with Russian references added or substituted in several chapters; lustrations are well reproduced. (*Same item as* 4.11–36 and 7.6–4, Nov. 1953 and June 1956, *IAB.*) *Subject Headings:* **1. Radio astronomy textbooks 2. Textbooks.**—*C.E.P.B., M.R.*

9A–21 551.521.9:523.85:621.396.822

Ryle, M. and Ratcliffe, J. A., **Radio-astronomy.** *Endeavour*, 11(43):117–125, July **1952.** 0 figs. **DLC**—An analytical study of the radiation from radio stars (outer space) which is character-:ed by the similarity to irregular e.m.f. (radio noise). No relation between bright radio stars and lisible stars is found. The radio emission from an average radio star is found to be at least 10^{18} mes as great as that from the undisturbed sun. A theory of solar radiation is discussed. A model hromosphere is presented and a map showing location of radio stars in the Northern Hemisphere given. *Subject Headings:* **1. Galactic radio noise 2. Radio astronomy.**—*W.N.*

1953

9A–22 551.521.7:523.74

Aktivität und Kurzwellenstrahlung der Sonne. [Activity and short-wave radiation of the sun.] *Die Umschau*, 53(4):103, Feb. 15, **1953.** 2 figs. **DWB**—Summary of report of Radio-astronomy bservatory of Cornell Univ. and McMath Hulbert Observatory of Univ. of Michigan on correlation etween solar activity and 1.5 m radiation from flares. *Subject Headings:* **1. Solar radio radiation . Solar activity.**—*C.E.P.B.*

9A–23 523.85:551.521.9:537.59

Appleton, Sir Edward, **Science for its own sake. Presidential Address to British Association, iverpool, 1953.** *Nature*, London, 172(4375):424–429, Sept. 5, **1953. DWB**—Mainly devoted to n account of radio astronomy, from Sir Oliver Lodge in 1900 to date, including a description of ie nature of some distant sources. Intense radio emission is attributed to gaseous velocities of veral thousand km a second. *Subject Heading:* **1. Radio astronomy.**—*C.E.P.B.*

9A–24 621.317:538.56

Bilotti, Alberto, **Estudio de microondas electromagnéticas.** [Study of electromagnetic micro-aves.] *Sociedad Científica Argentina, Anales*, 154(5,6):137–152, 160–174, Nov., Dec. **1952;** 55(1,2):11–26, 44–53, Jan., Feb. **1953.** 37 figs., 4 graphs, 3 refs., 43 eqs. **DLC**—Final report on ie design and construction of a coaxial laboratory oscillograph for the 10 cm band, and on results experimental measurements made with this instrument which was developed by the author. etailed circuit diagrams and theoretical instructions for the evaluation of measured magnitudes e included. *Subject Headings:* **1. Oscillographs 2. Electromagnetic waves.**—*G.T.*

9A–25 551.521.9:621.396

Bolton, J. G.; Slee, O. B. and Stanley, G. J., **Galactic radiation at radio frequencies, Pt. 5, he sea interferometer. Pt. 6, Low altitude scintillations of the discrete sources.** *Australian ournal of Physics*, Melbourne, 6(4):420–451, Dec. **1953.** figs., tables, refs. **DLC**—In Pt. 5, the ctors involved in the study of discrete sources of galactic noise by the sea interferometer are scussed. Three new forms of sea interferometer which increase the effectiveness of this technique e described. Pt. 6 represents a study that has been made of the scintillations of four discrete ources at altitudes of from 0 to 10°. The observations cover the years 1947–1951 and were made various frequencies in the range 40–300 Mc/s. It was found that the scintillation index, a measure the amplitude of the scintillations, (1) increases with increasing wavelength, (2) decreases rapidly ith increasing altitude, (3) shows seasonal and diurnal variations, the seasonal component having inima near the equinoxes and the diurnal component near dawn and sunset. The scintillation te, or the number of scintillations per minute (1) is different for sources of different declination, (2) independent of wavelength. In the case of the Cygnus source, the data for which are the most tensive, the rate increases and the decline in the scintillation index with altitude is less rapid during e winter months. A strong correlation is established between the occurrence of the scintillations id sporadic E. The difference in the scintillation rates for different rates for different sources can be plained in terms of variations in the size of irregularities and the effects of the winds in the E_s layer. or Pt. 4, *see* 4.9–111, 1953; for Pts. 7 & 8, *see* 6.6–217, 1955, *MAB.*) *Subject Headings:* **1. Galactic dio radiation 2. Sea interferometers 3. Scintillation.**—*Authors' abstract.*

9A–26 55.1521.9:621.396.8:523.85

Brown, R. Hanbury and Hazard, C., **A model of the radio-frequency radiation from the galaxy.** *hilosophical Magazine*, 7 Ser, 44(356):939–963, Sept. **1953.** 8 figs., 2 tables, 20 refs., 9 eqs. **WB**—"A model of the galaxy has been constructed which represents satisfactorily the radio-equency surveys which have been made in the range 18.3 Mc/s to 1200 Mc/s. The model consists

of a system of localized sources which are highly concentrated in the center of the galaxy and a disk of ionized interstellar gas whose properties are consistent with visual observations. It is suggested that the sources are rare members of Baade's population II and that they may be identified with the intense sources which have been observed to lie close to the galactic plane. The model requires the existence of a large isotropic component of radiation whose origin is probably extra-galactic." *Subject Heading:* **1. Galactic radio radiation.**—*Authors' abstract.*

9A–27 551.521.9:621.396.8:523.85

Brown, R. Hanbury and Hazard, C., **Radio-frequency radiation from the spiral nebula Messier 81.** *Nature*, London, 172(4384):853, Nov. 7, **1953.** fig., table, 5 refs. **DWB**—Observations on the 218 ft paraboloid at Jodrell Bank, Manchester, are described. The radio flux from a nebula of apparent magnitude +10 is approx. 4.2×10^{-26} watt/m²/c.p.s. at 158.5 Mc/s, and the ratio between the total light and radio fluxes is apparently constant. *Subject Headings:* **1. Galactic radio radiation 2. Nebular radio sources.**—*C.E.P.B.*

9A–28 523.75:621.396

Das, A. K. and Sethumadhavan, K., **Eruptive prominence of February 26, 1953, and associated radio noise-burst.** *Nature*, London, 172(4375):446–447, Sept. 5, **1953.** 4 figs., 3 refs. Also: Davies, R. D., **Radio observations at the time of an ascending solar prominence.** *Ibid.*, p. 447–448. **DWB**—Both notes refer to a prominence which broke off from sun's surface about 0510 hr. Spectrograms at Kodaikanal, India, show details of spiral motion and structure. Three solar noise bursts were recorded on 100 Mc/s at Kodaikanal and on several wave lengths at Sydney, Australia. *Subject Headings:* **1. Solar flares 2. Solar radio noise bursts 3. Kodaikanal, India.**—*C.E.P.B.*

9A–29 551.521.9:621.396.8:523.74

Das, A. K. and Bhargava, B. N., **Radio noise-bursts from solar M-regions.** *Nature*, London, 172(4384):855–856, Nov. 7, **1953.** fig., 2 refs. **DWB**—During passage of an M-region across the sun, Aug. 18–31, 1953, noise bursts were recorded at Kodaikanal synchronized with short-duration magnetic disturbances. Records are shown for Aug. 24, 25 and 29. *Subject Headings:* **1. Solar radio noise bursts 2. Kodaikanal, India.**—*C.E.P.B.*

9A–30 551.521.7:621.396.8:523.74

Dodson, Helen W. (*McMath-Hulbert Obs. Univ. of Mich.*), **Relations between flares and 1.5 meter solar radiation.** *International Council of Scientific Unions, Brussels, Commission for the Study of Solar and Terrestrial Relationships, Rome, Sept. 1952, Procès-Verbal et Communications*, pub. **1953.** p. 12. **DWB**—A brief note that disturbances on 1.5 m are associated with Hα flares. The typical form is a distinct "early" burst at the commencement of the flare and a "late" disturbance at or after maximum Hα radiation. The early burst coincides with high velocity ejection of hydrogen and ionized calcium. *Subject Headings:* **1. Solar radio radiation 2. Solar flares.**—*C.E.P.B.*

9A–31 523.75:551.521.7

Dodson, Helen W.; Hedeman, E. Ruth and Owren, Leif (*McMath-Hulbert Obs., Michigan Univ., and School of Elec. Engr., Cornell Univ.*), **Solar flares and associated 200 Mc/sec radiation.** *Astrophysical Journal*, 118(2):169–196, Sept. **1953.** 10 figs., 12 tables, foot-refs. **DWB**—Study of 200 Mc/sec solar radiation for the times of 194 flares indicates distinctive radio events associated with 78% of the flares. The flare-associated distinctive events can be divided into ten descriptive types or categories: major burst, major burst with second part, minor burst, minor burst with second part, micro burst, group of bursts, series of bursts, noise storm in progress, onset of noise storm and rise in base level. In addition, there is the designation "null," or no distinctive event. Consideration of the time relationships between flares and 200 Mc/sec events suggests that two quite different types of phenomena may be represented in the flare-associated 200 Mc/sec radiation. The first or "early" phenomena includes very sudden, relatively isolated, burstlike features which occur close to the time of start of the flare. The second or "late" phenomenon includes the more gradual rises in base level and onsets of noise storms. These usually start at or after the time of flare maximum. The "early" and "late" phenomena can occur in conjunction with each other or either of the two can occur separately. The importance of the flare, position on the solar disk and accompanying ionospheric disturbances are considered with respect to the form and energy excess of the flare-associated 200 Mc/sec events. The various aspects of the complex flare phenomenon, as observed photographically and visually, are discussed. An association is suggested between the high-velocity ejections observed at the *onset* of certain flares and the occurrence of major burst at 200 Mc/sec. From the point of view of the parameters considered in this paper the flares for which there were no distinctive events on the 200 Mc/sec records constitute a random sample from the entire set of 194 flares. *Subject Headings:* **1. Solar flares 2. Solar radio radiation.**—*Authors' abstract.*

9A–32 621.396.8:523.7

Dungey, J. W. (*Sydney Univ., School of Physics, N.S.W.*), **Bailey's theory of sunspot noise.** *Journal of Atmospheric and Terrestrial Physics*, London, 4(4/5):148–162, **1953.** 10 refs., 58 eqs. **DWB**—The exact formulation of BAILEY's theory for a nonuniform ionized gas is described and the boundary conditions are explained. A direct calculation is made of the rate of exchange of energy between the motion of the electrons and the wave. The intensity of the radiation arising from a transient disturbance is calculated and it is found that the intensity can become very large when the wave gains energy from the electrons. The general nature of the electron flow and the order of magnitude of the electron velocity needed for amplification to occur are discussed. *Subject Headings:* **1. Solar radio noise 2. Sunspot radio radiation.**—*Author's abstract.*

9A–33 551.521.9:621.396:546.11

Ewen, Harold I., **Radio waves from interstellar hydrogen.** *Scientific American*, 189(6):42–46, Dec. **1953.** 6 figs. **DWB**—The method of measuring the intensity and frequency of radio frequency radiation from interstellar clouds of hydrogen, as employed at Harvard, and by VAN DE HULST in Holland and KERR and HINDMAN at the Radiophysics Lab. in Sydney, Australia, is set forth in nontechnical language and amply illustrated with pictures of the radiotelescopes and diagrams showing the radio wave length (21 cm) spectral bands identified in the above manner. The theory which led to discovery of this second method of "spectroscopy" began with VAN DE HULST's prediction in 1944 that 1420 megacycle (21 cm) waves should come from hydrogen atoms in space. *Subject Headings:* **1. Radio astronomy 2. Hydrogen spectra 3. Radio frequency radiation 4. Magellanic clouds. I. van de Hulst, H. C.**—*M.R.*

9A–34 551.521.7:535.33

Fraser, P. A. and Jarmain, W. R., **Transition probabilities of molecular band systems, III. Calculation of intensities in the electronic spectra of Morse molecules,** (1). London, Ontario. University of Western Ontario, Contract AF 19(122)-470, Scientific Report, No. 5, Jan. 3, **1953.** 8 p. 15 refs., eqs. Also: Jarmain, W. R.; Fraser, P. A. and Nicholls, R. W. . . . IV, . . . Pt. 2. Idem, Scientific Report, No. 7, Feb. 2, **1953.** tables, refs., eqs. **DWB**—In the first paper an approximation is made which allows analytic integration of the "overlap" integrals, (v', v''), of vibrational wave functions corresponding to vibration in Morse potentials, and other integrals that occur in the study of the electronic band spectra of diatomic molecules. This avoids, for many transitions, the heavy and lengthy work that goes into numerical integrations. The necessity for the type of approximation made is discussed from the point of view of the wholesale cancellation that occurs in evaluating these integrals. An indication is made of the validity and applicability of the approximation and of the formulas thus derived. In the second paper results obtained for the $B^3\pi \rightarrow A^3\Sigma$ and $C^3\pi \rightarrow B^3\pi$ transitions of molecular nitrogen are presented, computed by an approximate analytical method. *Subject Heading:* **1. Radiation calculations.**—*Authors' abstract, A.A.*

9A–35 551.521.7:551.593.7

*Hatanaka, Takeo, **Position and polarization of solar radio bursts on 200 Mc/s.** Cornell Univ. School of Electrical Engineering, Contract AF 19(604)-73, Scientific Report, No. 2, Dec. 31, **1953.** 16 p. 8+6 tables, numerous graphs, 4 refs. **DWB**—It is known that solar radio bursts in the meteor wavelength range are sometimes observed to be randomly polarized and sometimes circularly polarized, and bursts are roughly classified by their polarization. But little study has been done on the nature of the polarization of bursts when they are not circularly polarized. It is the purpose of the present paper to investigate this point by using the observations made by a circularly polarized system, a linearly polarized system and an interferometer. *Subject Headings:* **1. Solar radio noise bursts 2. Polarization 3. Interferometers.**—*Author's abstract.*

9A–36 551.521.7:621.396.8:523.7

Hey, J. S., **Solar radio emissions at 4-metres wavelength during 1947–50 inclusive and their relation to solar activity.** *International Council of Scientific Unions. Commission for the Study of Solar and Terrestrial Relationships, Rome, Sept. 1952, Procès-Verbal et Communications*, pub. **1953.** p. 16. **DWB**—Analysis of bursts of solar radio emission shows an average lag of a few minutes after solar flares, but some bursts precede the flares. The average order of occurrence of onset and maxima is set out. *Subject Headings:* **1. Solar radio radiation 2. Solar flares.**—*C.E.P.B.*

9A–37 551.521.9:621.396.8:523.8

Jennison, R. C. and Gupta, M. K. Das, **Fine structure of the extra-terrestrial radio source Cygnus I.** *Nature*, London, 172(4387):996–997, Nov. 28, **1953.** 2 figs., table, 7 refs. Also: Brown, R. Hanbury and Hazard, C., **An extended radio-frequency source of extra-galactic origin.** *Ibid.*, 997–998, fig., 8 refs. **DWB**—These letters describe investigations at Jodrell Bank, Cheshire. The simplest distribution on 125 Mc/s has two narrow components 51″ wide separated by 1′28″.

2) A map of the celestial sphere is included, showing nebulae, boundaries of radiation on 158 Mc/s and maximum intensity on 250 Mc/s. *Subject Headings:* **1. Galactic radio radiation 2. Stellar radio radiation 3. Jodrell Bank, Cheshire, Eng.**—*C.E.P.B.*

9A–38 551.521.1:523.74

Jorand, Michel, **Le rayonnement radioélectrique des taches solaires sur 160 Mc/sec de 1948 à 1951.** [Radioelectric radiation of sunspots on 160 Mc/sec from 1948 to 1951.] *Annales d'Astrophysique*, 16(3):151–161, May/June **1953.** 5 figs., 19 refs. **DLC**—Solar radiation amounts on 160 Mhz over the period 1948–1951 are investigated statistically. It is shown that sunspots definitely affect radiation amounts from the 4th day preceding until the 3rd day following the passage of the sunspots through the central meridian. This directivity can be accounted for by assuming that the emission takes place at 1/10 solar radius above the chromosphere, and that its general direction is E–W. *Subject Headings:* **1. Solar radio radiation 2. Sunspots.**—*Trans. of author's abstract.*

9A–39 522.2:621.396.029

†Kraus, John D. and Ksiazek, Edward (*both, Ohio State Univ.*), **New techniques in radio astronomy.** *Electronics*, Albany, 26(9):148–152, Sept. **1953.** 11 figs., 18 refs. illus. fr. cov. **DWB**—Radio astronomy and its applications are discussed. This new science, it is explained, involves the observation of celestial objects by the radio waves they emit. The radio telescope installed at Ohio State Univ. in Oct. 1952 is described and illustrated; its circuit diagrams are presented and its operation discussed. The radio telescope consists of a series of 48 helical beam antennas mounted on a steel screen 160 ft long. It operates at 250 mc with a beam width of 1.2 deg. *Subject Headings:* **1. Radio astronomy 2. Radio telescopes.**—*G.T.*

9A–40 551.521.

Sen, Hari K. (*Nat. Bur. of Standards, Wash., D. C.*), **An estimate of the density and motion of solar material from observed characteristics of solar radio outbursts.** *Australian Journal of Physics*, Melbourne, 6(1):67–72, March **1953.** fig., table, 11 refs., 18 eqs. **DLC**—The theory of radio wave generation by multistream charge interaction (Feinstein and Sen, 1951) is extended and applied to the observations made by Australian workers (Wild, 1950) of the spectrum of outbursts of solar radio-frequency radiation in the frequency range 70–130 Mc/s. The dispersion equation is derived as a function of the velocity of solar material and the corona. The application of the dispersion equation to the Australian data (loc. cit) enables an estimate to be made of the velocity ($\simeq$500 km/s) and the particle density ($\simeq 10^8$ cm^{-3}) of the moving solar material. *Subject Headings:* **1. Solar radio radiation 2. Corpuscular radiation 3. Solar radio noise.**—*Author's abstract.*

9A–41 551.521.

*Tanaka, Haruo and Kakinuma, Takakiyo, **Observations of solar radio noise at 3,750 MC** *Nagoya. University. Research Institute of Atmospherics, Proceedings*, 1:103–107, Jan. **1953** 2 figs., 2 tables. **DWB**—Summary of data from station near Nagoya for the Sub-Committee for Worldwide Network on Solar Radio Emission of the U.R.S.I. Test observations from April–July 1951 and daily values from Nov. 1951 to Jan. 1953 are given on graphs, and data for outstanding occurrences in tables (starting time, duration, type, maximum intensity and time, and radio fadeouts). *Subject Headings:* **1. Solar radio noise data 2. Nagoya, Japan.**—*M.R.*

9A–42 621.396.8:551.521

Vauquois, Bernard; Coupiac, Pierre and Laffineur, Marius, **Étude expérimentale des orages radioélectriques solaires.** [Experimental study of radioelectric solar storms.] *Académie des Sciences, Paris, Comptes Rendus*, 237(25):1630–1632, Dec. 21, **1953.** fig., 5 refs. **DLC**—The results of observations of simple radio electric storms of solar origin on 5 occasions in 1952 and 1953 at Sydney, Cambridge, Nera, and Meudon indicate that there is a dissymmetry which depends on the longitude of the sunspots and on the wave length. *Subject Headings:* **1. Solar radioelectric storms 2. Sunspots.**—*M.R.*

9A–43 551.521.7:523.74

Waldmeier, M., **Die Randverdunkelung der radiofrequenten Sonnenstrahlung bei $\lambda = 10.7$ cm** [The marginal weakening of the radio frequency solar radiation at 10.7 cm.] *Zeitschrift für Astrophysik*, 32(2):116–124, **1953.** 3 figs., 5 tables, 7 refs. English and German summaries p. 6. **DWB**—The intensity of radiation on 10.7 cm originating from coronal condensations above sunspots falls at edge to 22% of central intensity. This is attributed to the ellipsoidal structure of the condensations. *Subject Headings:* **1. Sunspots 2. Solar radio radiation.**—*C.E.P.B.*

9A–44 551.521.9:621.396.8:523.75

Wild, J. P.; Murray, J. D. and Rowe, W. C., **Evidence of harmonics in the spectrum of a solar radio outburst.** *Nature*, London, 172(4377):533–534, Sept. 19, **1953.** 3 figs., 6 refs. **DWB**—An outburst of radio noise on Nov. 21, 1952, accompanied by two flares, was analyzed from 38–220 Mc/s. Radiation occurred in two widely spaced frequency bands, each drifting from high to low frequencies and frequency ratio nearly 2. Explained by emission at harmonic frequencies combined with absorption in solar atmosphere and a cut-off in solar atmosphere at a low frequency. *Subject Headings:* **1. Solar radio noise 2. Solar flares.**—*C.E.P.B.*

1954

9A–45 621.396.8:551.521.7

†Aarons, Jules, **The solar noise geophysical events relationship.** *International Council of Scientific Unions, Brussels, Eighth Report of the Commission for the Study of Solar and Terrestrial Relationships.* Paris, **1954.** p. 93–97. 25 refs. **DWB**—Summarizes recent work on "the statistical study of solar noise—ionospheric disturbances; the eclipse measurement of radio emissive and optically active solar centers; and the statistical differentiation between sunspot groups which produce increases in radio energy and magnetic variations, and sunspot groups which do not." *Subject Heading:* **1. Solar radio radiation.**—*C.E.P.B.*

9A–46 551.521.9:621.396.8:523.8

Baldwin, J. E. and Elsmore, B., **Radio emission from the Perseus cluster.** *Nature*, London, 173(4409):818, May 1, **1954.** 2 figs., 5 refs. Also: Hey, J. S. and Hughes, V. A., **Intensities of discrete radio sources in Cygnus and Cassiopeia at 22.6 Mc/s.** *Ibid.*, 819–820. fig., table, 13 refs. **DWB**—1. It is found that about $\frac{3}{4}$ of the radiation from the Perseus cluster on 3.7 m originates in a region of small angular size including NGC 1275. 2. Observations at low frequencies show that intensity increases as frequency decreases but at 22.6 Mc/s intensity of Cygnus is 20% less than expected, possibly due to ionized interstellar gas near the galactic equator. *Subject Heading:* **1. Stellar radio radiation.**—*C.E.P.B.*

9A–47 551.521.9:621.396

†Bracewell, R. N. and Roberts, J. A. (*Div. of Radiophysics, Univ. of Sydney*), **Aerial smoothing in radio astronomy.** *Australian Journal of Physics*, Melbourne, 7(4):615–640, Dec. **1954.** 14 figs., 3 tables, 27 refs., eqs. **DLC**—When an aerial is used to survey the distribution of radio brightness over the sky, the observed distribution is smoother than the true distribution; the broader the beam of the aerial, the greater the smoothing. It is shown that the aerial does not register those spatial Fourier components of the true distribution having frequencies beyond a cut-off determined by the aerial aperture. Components of lower frequency are registered but their relative strengths are altered. Two important consequences follow. (1) There are *invisible distributions* which produce no response when scanned by the aerial. Consequently there is not a unique solution to the problem of correcting for aerial smoothing. The established method of correcting by successive smoothing, led to the *principal solution*, in which Fourier components accepted by the aerial have been restored to their full values, but the components rejected by the aerial are still not represented. (2) In conducting a survey it is sufficient to observe at discrete intervals. The measuring points must be closer together than half the period of the Fourier component at cut-off. For an aperture of width w, this *peculiar interval* is equal to $\frac{1}{2}\lambda/w$ (radians). *Subject Headings:* **1. Radio astronomy 2. Aerial smoothing.**—*Author's abstract.*

9A–48 551.521.1:535.243

Dodson, Helen W. (*McMath-Hulbert Obs., Univ. of Michigan*), **Intensity measures of calcium *plages* for comparison with 10.3-centimeter solar radiation October 16, 1951.** *Astrophysical Journal*, Chicago, 119(3):564–568, May **1954.** 2 figs., table. **DWB**—Photometric studies of K_{232} spectroheliograms for Oct. 16, 1951, are compared with Covington's records of the positions of 10.3-cm (2800 Mc/sec) emissive regions on the sun for the same date. There were three emissive regions at 10.3 cm, and there were three maxima in the east-west distribution of calcium *plage* intensity on the solar disk. Sunspots were observed in only two of the three regions. *Subject Headings:* **1. Spectrophotometric observation 2. Solar radio radiation.**—*Author's abstract.*

9A–49 523.75

†Ellison, M. A., **Observation of solar flares, 1951–1953.** *International Council of Scientific Unions. Brussels, Eighth Report of the Commission for the Study of Solar and Terrestrial Relationships.* Paris, **1954.** p. 27–34. 2 tables, fig., 19 refs. **DWB**—Measurements of line widths and central intensities are described. Special studies are reported by Helen W. Dodson (Univ. Michigan)

on brightness of solar flares, Hα width and radio frequency radiation. A number of recent papers are summarized. *Subject Headings:* **1. Solar flares 2. Solar radio radiation.**—*C.E.P.B.*

9A–50 551.521.7:523.74:551.594.6

Eriksen, Gunnar, **Radiostraling fra solen.** [Radio radiation from the sun.] *Naturen*, Bergen, 78(7):194–206, **1954. DWB**—Instrumentation of the radio department of the Solar Observatory at Harestua (near Oslo, Norway) is described and some of the activities are discussed. The solar noise will be recorded simultaneously over several wave lengths and stress will be laid on the study of localization of the sun's turbulent centers. This picture of the variation in the spectral distribution of solar noise will be compared with results as obtained by optical methods. *Subject Headings:* **1. Solar radio noise observation 2. Solar observatories.**—*W.N.*

9A–51 621.396.61

Field, Marshall James, **A VHF bridged-T crystal oscillator and measurement of its frequency stability.** Cornell Univ., School of Electrical Engineering, Contract AF19(604)-73, Scientific Report No. 4, Aug. 30, **1954.** 63 p. 13 figs., 23 refs., 3 tables, eqs. **MH-BH**—Report on production and testing of a crystal oscillator to operate at 80 megacycles/sec with a frequency stability of 1 in 10^7 for about four hours. *Subject Headings:* **1. Microwave oscillators 2. Radio instruments.** —*M.R.*

9A–52 551.021.9 551.501.8:52

Ginsburg, V. L., **Radioastronomiia.** [Radio astronomy.] *Priroda*, Moscow, 5.12–21, May **1954.** 6 figs., 12 refs. **DLC**—A concise, not very technical, account of the development of radio astronomy with particular emphasis upon Soviet contributions. The author describes the radio telescopes and installation with the aid of illustrations employed to study the radio signals of solar and cosmic origin and discusses the (1) relationships between short wave lengths and solar temperature and sunspots, (2) possible mechanism of the production of sporadic solar radio waves, (3) radio waves from the galactic system and from individual stars such as giant stars and (4) radio stars. *Subject Heading:* **1. Radio astronomy.**—*I.L.D.*

9A–53 551.521.7:621.396.8:523.74

Hatanaka, Takeo, **A solution for the path of radio waves through the solar atmosphere by elliptic integrals.** Cornell Univ. School of Electrical Engineering, Contract AF 19(604)-73, Scientific Report, No. 3, Jan. 31, **1954.** 22 p. 8 figs., 4 tables, 32 eqs. **DWB**—*Subject Headings:* **1. Solar radio radiation 2. Astrophysics.**

9A–54 551.521.7:621.396.8:523.7:550.385

Hey, J. S. and Hughes, V. A., **Solar radio asymmetry at 4-metres wave-length.** *Nature*, London, 173(4408):771, April 24, **1954.** 3 refs. **DWB**—In 1948 Hey, Parsons and Phillips found that bursts of radio emission on 4.1 meters occurred more often associated with flares on eastern than western half of the sun. In 1953 Dodson, Hedeman and Owren did not find this effect on 1.5 m. Hey and Hughes now point out that this result is to be expected because absorption coefficient is proportional to 2^2 and the difference may be still further increased by refraction. Asymmetry increased in 1950–51 when recurrent M-type magnetic storms were becoming prominent, but observations had to be discontinued in 1951. *Subject Headings:* **1. Solar radio radiation 2. Magnetic storms.**—*C.E.P.B.*

9A–55 551.521.7:621.396

†International Scientific Radio Union, **Discrete sources of extra-terrestrial radio noise.** Its *Special Report*, No. 3, **1954.** 56 p. 16 figs., tables, refs., eqs. **DWB**—Work in the field of discrete sources of extra-terrestrial radio frequency radiation has been carried on for only 8 years, but a large number of papers has been published during the past 4 years, as can be seen in the extensive bibliography. This work is summarized systematically by the members of the Sub-Committee on Discrete Sources (Bolton, Smith, Hanbury-Brown and Mills), including in the report a brief account of techniques used up to 1952, with footnotes to bring the account up to Sept. 1953. The main subjects in addition to the general survey of the field are: identifications, electromagnetic spectra, distribution of sources, scintillation and refraction, the detection of sources and determination of positive and angular width. *Subject Headings:* **1. Galactic radio radiation 2. Progress reports.** —*M.R.*

9A–56 621.396.8

†International Scientific Radio Union, **The distribution of radio brightness on the solar disk [and] Interstellar hydrogen.** Its *Special Report*, No. 4 and No. 5, **1954.** 71 p. 16+6 figs., bibliog. p. 44–46, and p. 72. **DWB**—A general and systematic summary of progress in radio astronomy (mainly

of an experimental nature). Results of measurements in cm, dm, and m(eter) wave lengths are separately summarized. The quiet sun radiation is discussed independently of the variable components of solar radiation. Deductions as to the temperatures of various elements of the solar atmosphere are presented graphically and verbally. A long chronological list of references is appended, mostly 1946–1954. *Subject Headings:* **1. Radio astronomy 2. Solar temperature 3. Progress reports.**—*M.R.*

9A–57 621.396.8:522:06:016

†International Scientific Radio Union, 11th General Assembly, The Hague, Aug. 23–Sept. 2, 1954, **Proceedings, Vol. 10, Pt. 5, Commission No. 5 on Radio Astronomy, 1955?** 113 p. tables, refs. **DWB**—Membership of the Commission on Radio Astronomy and subcommissions (Solar Radio Emissions, Terminology, Basic Solar Index and Standardization of Equipment and Measurements), a list of 27 reports and papers submitted, reports of subcommissions, reports of national committees of Australia, Canada, Finland, France, Germany, Great Britain, Italy, Japan, Netherlands, Spain, Sweden, Switzerland and U. S., address of M. Laffineur, President, minutes of sessions, etc. are included in report along with numerous references to literature published in each country. *Subject Headings:* **1. Radio astronomy conferences 2. Radio astronomy bibliographies 3. International Scientific Radio Union.**—*M.R.*

9A–58 551.521.7:550.385

Kiepenheuer, K. O. (*Fraunhofer Institute, Freiburg*), **Emission of corpuscles from the sun.** *U. S. Air Force. Cambridge Research Center. Geophysical Research Papers*, No. 30:403–413, July **1954.** table, 30 refs., 6 eqs. Discussion p. 409–411. Also in: *Journal of Geophysical Research*, 57(1):113–120, March **1952.** table, 13 refs., 5 eqs. **DWB, DLC**—The arguments in favor of an interaction of solar corpuscles with the earth's magnetic field are critically reviewed. Two kinds of corpuscles are identified: (a) those producing the great magnetic storms and (b) those causing the more frequent minor disturbances of the earth's magnetic field. Both kinds of corpuscular radiation contribute to the formation of aurorae. The emission of storm-producing particles by solar flares is discussed. It is shown that a thin shell of chromospheric gas which forms the upper layer of the solar flare can be expelled by the radiation pressure of the flare's emission; this emission acts primarily on the Ca^+ ions. In this way the calcium ions, which form only a small fraction of the total chromospheric gas, soon become separated from the bulk of hydrogen. Thus, only a small part of the total energy radiated by a flare is used to accelerate the swarm of calcium ions. It is also indicated that the lifetime of the Ca^+ ion in the chromosphere and the corona, from its start to its photo-ionization by the ultraviolet light of the flare, is long enough to survive the process of acceleration. While the storm-producing particles form a distinct cloud, which will strike the earth only once, the corpuscles responsible for the minor disturbances of the earth's magnetic field obviously form a kind of permanent stream. The latter corpuscles emanate from long-lived solar sources; the so-called M regions. The pronounced 27-day recurrence of the minor perturbations can be accounted for only in this way. It is believed that these streams of corpuscles are identical with the extreme (and invisible) extensions of the coronal streamers, which can be seen during total solar eclipses. *Subject Headings:* **1. Corpuscular radiation 2. Magnetic storms.**—*From author's abstract.*

9A–59 551.521.9:537.59:621.396.826

Larenz, R. W., **Ladungstrennung bei Strömungen in ionisierten Gasen und kosmische Radiofrequenzstrahlung.** [Separation of charges in currents in ionized gases and cosmic radio-frequency radiation.] *Naturwissenschaften*, 41(20):470–471, Oct. **1954.** 2 figs., 3 refs. **DWB**—An approximate solution is given for the amplitude limit and frequency of radio waves emitted from a plasma in terms of the density and effective temperature of ions and electrons. *Subject Heading:* **1. Stellar radio radiation.**—*C.E.P.B.*

9A–60 551.521.9:621.396.8:523.8

McGee, R. X. and Bolton, J. G., **Probable observation of the galactic nucleus at 400 Mc/s.** *Nature*, London, 173(4412):985–987, May 22, **1954.** 2 figs., 4 refs. **DLC**—Observations at Sydney, N.S.W. show the presence of a small powerful emitter (aerial temperature nearly 400°K) at the center of the Milky Way. *Subject Headings:* **1. Stellar radio radiation 2. Sydney, N.S.W.**—*C.E.P.B.*

9A–61 551.521.7:523.74:621.396.8

Machin, K. E. and O'Brien, P. A., **The emission polar diagram of the radio-frequency radiation from sunspots.** *Philosophical Magazine*, 7 Ser., 45(368):973–979, Sept. **1954.** 5 figs., 7 refs., eqs. **DWB**—Observation of solar radiation on 81.5, 175 and 500 Mc/s at Cambridge, Eng., are analyzed by autocorrelation up to 60 days and emission polar diagrams of radio-frequency radiation from

sunspots are constructed. At 175 Mc/s there is a 27-day recurrence comparable with that of visible sunspots. At 81.5 Mc/s life is only a few days and at 500 Mc/s variations are irregular. *Subject Headings:* **1. Solar radio radiation 2. Sunspots 3. Cambridge, Eng.**—*C.E.P.B.*

9A–62 523.16:621.396.8

Piddington, J. H. and Hoyle, F., **Generation of radio noise by cosmic sources.** *Nature*, London, 173(4402):482–484, March 13, **1954.** 13 refs. **DWB**—Discussion of PIDDINGTON's and HOYLE's theories of galactic radiation on 1 m wave-length. HOYLE calculates that the conversion of dynamical energy of mass motion in the collision of the Cygnus galaxies into radio energy is a sufficient source. *Subject Heading:* **1. Galactic radio noise.**—*C.E.P.B.*

9A–63 551.521.7:523.72:534.222.2

Sen, Hari K. (*U. S. Nat'l Bureau of Standards, Wash., D. C.*), **Space charge wave amplification in a shock front and the fine structure of solar radio noise.** *Australian Journal of Physics*, Melbourne, 7(1):30–35, March **1954.** 2 figs., 11 refs., 6 eqs. **DWB**—The Mott-Smith (1951) interpolation method gives a non-Maxwellian velocity distribution for the particles in a shock front. The dispersion equation corresponding to the non-Maxwellian distribution is derived by VLASOV's (1945) formula. The roots of the dispersion equation indicate frequency bandwidths of space charge wave amplification that decrease with the shock strength. It is suggested, in agreement with DENISSE and ROCARD (1951), that the storm bursts of narrow bandwidth originating in shock fronts constitute the elementary fine-structure components of solar radio noise bursts. *Subject Headings:* **1. Solar radio noises 2. Shock fronts 3. Explosion waves.**—*Author's abstract.*

9A–64 551.521.9:551.510.535:523.75:621.396.8

Shain, C. A. and Mitra, A. P., **Effects of solar flares on the absorption of 18.3 Mc/s cosmic noise.** *Journal of Atmospheric and Terrestrial Physics*, 5(5–6):316–328, Nov. **1954.** 7 figs., 3 tables, 10 refs. **DWB**—Observations of abnormal ionospheric absorption in New South Wales showed sudden increases coinciding with SID's and solar flares. "An increase of 1 db in absorption of 18.3 Mc/s radiation passing once through the ionosphere is probably associated with a sudden phase anomaly of size about 200° at 16 kc/s. Such a relationship is incompatible with a D-region of the simple Chapman type or one of the 'exhaustion region' type. About 30 hrs after certain solar flares of Class 3 the absorption of cosmic noise increased, the increase lasting for periods of the order of 10 hours. Magnetic storms did not follow until some time later, and at the time of the abnormally high attenuation there were no outstanding peculiarities in magnetic records. It is uncertain whether the excess attenuation occurs within the ionosphere or well away from the earth." *Subject Headings:* **1. Ionospheric absorption 2. Solar radio radiation 3. Solar flares 4. New South Wales.**—*From authors' abstract.*

9A–65 551.521.9:537.59

Shain, C. A. and Higgins, C. S., **Observations of the general background and discrete sources of 18.3 Mc/s cosmic noise.** *Australian Journal of Physics*, 7(1):130–149, March **1954.** 11 figs., 2 tables, 12 refs. **DLC**—A survey of a broad strip of the sky, centered on Dec.—32°, has been made at a frequency of 18.3 Mc/s using an aerial with an overall beam width to a half-power of 17°. Previous results concerning the background distribution of brightness have been confirmed and 37 discrete sources have been detected. The distribution of these sources shows some galactic concentration; it becomes homogeneous if sources within 18° of the galactic plane are excluded. From observations of source scintillations, it is concluded that some of the discrete sources have angular sizes of the order of 1°. No correlation was found between the occurrence of scintillations and published ionospheric data, but the observations are consistent with an origin of the scintillations in irregularities, of dimensions about 4 km, at a height of about 500 km. *Subject Headings:* **1. Galactic radio noise 2. Scintillation.**—*Authors' abstract.*

9A–66 551.501.8:52

Stratton, F. J. M. (*Caius College, Cambridge*), **Radio astronomy.** *Pakistan Journal of Science*, Lahore, 6(3):137–141, July **1954.** **DWB**—The science of radio astronomy was born on Feb. 26, 1942 in England when all radar sets reported unidentified noise, later found to come from the sun. The science could not be developed until after the war when radar sets became surplus and were used for nonmilitary research such as detecting meteors or charged particles in the train of a meteor. Also, disturbances on the sun or in the chromosphere can be mapped; eclipses do not completely block radiations; structure of Milky Way can be determined. Radio stars were first detected in 1932 by JANSKY—now it is found they are not points (stars) but areas (discrete sources). By observing radio stars from 3 points the structure or disturbances in ionosphere can be determined. New 250 ft radio telescope at Manchester, Eng. will enable us to see farther into space than ever

efore. Finally, hydrogen line (21 cm) is visible. *Subject Headings:* **1. Radio astronomy 2. Manhester, Eng.**—*M.R.*

1955

9A–67 621.396.6

Bills, D. G. and Allen, F. G. (*both, Lyman Lab. of Physics, Harvard Univ.*), **Ultra-high vacuum alve.** *Review of Scientific Instruments*, 26(7):654–656, July **1955.** 4 figs., foot-refs. **DWB, DLC**—An all-metal ultra-high vacuum valve is described. The valve has a continuously variable onductance from about 1 1/sec to less than 10^{-14} 1/sec and presumably as small as desired. An quilibrium method of measuring small leakage conductances is described. *Subject Heading:* **1. Radio alves.**—*Authors' abstract.*

9A–68 551.521.9:523.45

Burke, B. F. and Franklin, K. L. (*both, Terr. Mag., Carnegie Inst. of Washington*), **Observations f a variable radio source associated with the planet Jupiter.** *Journal of Geophysical Research*, Wash., D. C., 60(2):213–217, June **1955.** 3 figs., 2 refs. **DWB**—A source of variable 22.2-Mc/sec adiation has been detected with the large "Mills Cross" antenna of the Carnegie Institution of Washington. The source is present on nine records out of a possible 31 obtained during the first quarter of 1955. The appearance of the records of this source resembles that of terrestrial interference, but it lasts no longer than the time necessary for a celestial object to pass through the antenna pattern. The derived position in the sky corresponds to the position of Jupiter and exhibits the reocentric motion of Jupiter. There is no evident correlation between the times of appearance of his phenomenon and the rotational period of the planet Jupiter, or with the occurrence of solar ctivity. There is evidence that most of the radio energy is concentrated at frequencies lower than 8 Mc/sec. (For Pt. 2, *see* 7.10–17, Oct. 1956, *MAB.*) *Subject Headings:* **1. Radio radiation from lanets 2. Jupiter.**—*Authors' abstract.*

9A–69 551.521.7:621.396.8 532.72:538.56

Christiansen, W. N. and Warburton, J. A., **The distribution of radio brightness over the solar lisk at a wavelength of 21 centimeters. Pt. 1, A new highly directional aerial system.** *Australian Journal of Physics*, 6(2):190–202, June **1953.** 6 figs., 2 refs., plate. **Pt. 2, The quiet sun—one-imensional observations.** *Ibid.*, 6(3):262–271, Sept. **1953.** 5 figs., 16 refs. **Pt. 3, The quiet sun—wo-dimensional observations.** *Ibid.*, 8(4):474–486, Dec. **1955.** 13 figs., 9 refs. **DLC**—A new erial system of very high resolving power has been designed and is described in the first paper (for more detailed abstract of Pt. 1, *see* 5.7–214, July 1954, *MAB*). The second paper reports alculations of the radial distribution of brightness based on daily records of one-dimensional distribution of radio brightness over the sun. The calculations are found to show marked limb-brightening and to be consistent with the calculated brightness distribution for a simple solar model in which he assumed values of temperature and density are close to those commonly accepted. According to he third paper, one-dimensional profiles of the quiet sun (1952–1954) for various scanning directions were combined and a Fourier method adopted to derive a two-dimensional brightness distribution. The distribution shows marked limb-brightening in the equatorial zones but none in the polar regions. The contours of brightness are in general conformity with those expected from a solar atmosphere having a coronal electron density distribution proposed by van de Hulst for the period of minimum unspot activity. *Subject Headings:* **1. Solar radio radiation 2. Solar radio brightness 3. Minimum unspot activity.**—*From authors' abstracts.*

9A–70 551.521.7:629.396.8:523.78

Coupiac, Pierre; Laffineur, Marius and Vauquois, Bernard (*all, Institut d'Astrophysique*), **Observations radioélectriques de l'éclipse totale de soleil du 30 juin 1954.** [Radio-electric observations of the total sun eclipse of June 30, 1954.] *Annales d'Astrophysique*, Paris, 18(4):271–278, **1955.** 8 figs., 3 tables. French and Russian summaries, p. 271. **DWB, DLC**—Observations of the solar emissions on 545 mc/s (55 cm) were made by the Bureau of Longitudes at Hogby, Sweden, on the Island of Oland, about 8 km N of the line of totality of the eclipse of June 30, 1954, using the same equipment used at Khartoum during the eclipse of Feb. 25, 1952. Results are compared with those at Meudon on the same day (partial eclipse) at 545 to 255 mc/s. Sample registrations during eclipse, corrections, reduced curves, and actual data are presented. *Subject Headings:* **1. Solar adio radiation during eclipse 2. Solar eclipses 3. Hogby, Sweden.**—*M.R.*

9A–71 551.521.9:621.396.8:523.8

Davies, R. D. and Williams, D. R. W., **An alternative identification of the radio source in the lirection of the galactic centre.** *Nature*, London, 175(4468):1079–1081, June 18, **1955.** 2 figs., 15 refs. **DWB**—Evidence is presented that the radio source of diameter about 1°, hitherto identified with the center of the galaxy at a distance of about 8 k parsecs, is actually from an ionized region of

gas distant about 3 k parsecs, possibly associated with a group of hot stars. *Subject Heading:* **1. Stellar radio radiation.**—*C.E.P.B.*

9A–72 523.32:621.396.8:523.8

Elsmore, B. and Whitfield, G. R., **Lunar occultation of a radio star and the derivation of an upper limit for the density of the lunar atmosphere.** *Nature*, London, 176(4479):457–458, Sept. 3, 1955. 2 figs., 6 refs. **DWB**—On April 26, 1955, the moon occulted the radio source in Gemini. Observations at Cambridge, Eng., on 7.9 and 3.7 m suggest that the density of the lunar atmosphere is $<10^{-12}$ of earth's atmosphere at sea level. On sunlit side ionization is as great as in *F*-region. *Subject Headings:* **1. Lunar atmosphere 2. Radio stars 3. Cambridge, Eng.**—*C.E.P.B.*

9A–73 551.521.7:629.396.8:523.78

Eriksen, G.; Hauge, O. and Tandberg-Hanssen, E., **Radio-frequency observations of the solar eclipse of June 30, 1954.** *Astrophysica Norvegica*, Oslo, 5(4):131–152, 1955. 17 figs., (incl. photos), 2 tables, 9 refs. **DWB, DLC.** Also issued as Oslo. Universitet. Institutt for Teoretisk Astrofysikk, Contract AF 61(514)-651-C, Scientific Report, No. 1, 1955.—Radio-frequency power received from the sun at wavelengths of 60 cms and 1.5 m was measured during the solar eclipse of June 30, 1954. The sun was essentially free from active areas, and the eclipse curves obtained have been used to derive models of the radio sun at the two wavelengths. These models give predicted eclipse curves in good agreement with the observed ones. Comparison has been made with models derived by other investigators on the same wavelengths. *Subject Headings:* **1. Solar radio radiation during eclipse 2. Solar eclipses.**—*Authors' abstract.*

9A–74 621.396.11 537.525

†Foulds, K. W. H., **Resonant-cavity measurements of the relative permittivity of a D.C. discharge.** *Institution of Electrical Engineers, Proceedings, Pt. C, Monographs*, 102(2):203–216, Sept. 1955. 14 figs., 4 tables, 31 refs. **DLC.** Note: also issued as an *Institution Monograph*, March 1955.—The relative permittivity of a gaseous discharge has been measured at 2100, 2500, and 3000 Mc/s, using an H_{011} resonant-cavity method. The preliminary experiments were carried out using a discharge in a mixture of argon (2.5 mmHg pressure) and mercury vapor. Later experiments employed a specially constructed low-pressure mercury-vapour tube. The relative permittivity of each discharge decreases from unity almost linearly for increases in the discharge current. In the case of the low-pressure mercury-vapor discharge it has been observed that the Q-factor falls to a minimum at a particular discharge current which depends upon the resonant frequency of the cavity. It is suggested that this is due to an electron resonance phenomenon. The detailed theory of the method of measurements is given in an appendix. *Subject Headings:* **1. Electrical discharges 2. Ultrashort wave resonance.**—*Author's abstract.*

9A–75 550.385:551.521.7

Grenet, Gaston, **Explication qualitative du début de certaines perturbations magnétiques polaires au moyen de la théorie de Chapman et Ferraro.** [Qualitative interpretation of the commencement of certain polar magnetic disturbances on the basis of the Chapman-Ferraro theory.] *Académie des Sciences, Paris, Comptes Rendus*, 240(4):448–450, Jan. 24, 1955. fig., 4 refs. **DWB**—Theoretical considerations lead to the conclusion that the progressive development of the initial phase of certain polar magnetic pulsations may be qualitatively but not quantitatively explained by the Chapman-Ferraro theory. This theory contemplates the induction of currents in ionized clouds of solar origin, at a distance of several terrestrial radii from the earth. *Subject Headings:* **1. Magnetic disturbances 2. Solar emanations.**—*G.T.*

9A–76 621.396.633:522.22

Hooghoudt, B. G., **De bouw van de grote radiotelescoop te Dwingeloo vordert.** [The construction of the large radiotelescope at Dwingeloo.] *Hemel en Dampkring*, 53(3):45–56, March 1955. 9 figs. (incl. photos). **DLC**—A radiotelescope 25 m in diameter is being built at Dwingeloo. With the aid of photographs and diagrams the author describes the construction and installation of the instrument and discusses its value in radioastronomy. *Subject Headings:* **1. Radio telescopes 2. Dwingeloo, Netherlands.**—*I.L.D.*

9A–77 551.501.8:52

Jennison, R. C., **The radio exploration of space.** *British Interplanetary Society, Journal*, 14(6):307–314, Nov./Dec. 1955. **DLC**—The general principles and applications of radio astronomy are outlined, and reference is made to the various types of radio telescopes in use at present. A short account is given of the detection of meteor activity, the aurora, and the moon by radar techniques; the remainder of the paper describes the various aspects of radio astronomy associated

ith the emission of radio noise. *Subject Headings:* **1. Radio astronomy 2. Radio noise.**—*Author's bstract.*

9A–78 523.78:621.396.029:551.510.535

Karpov, A. N., **Izmenenie sily radiosignalov vo vremia solnechnogo zatmeniia 30 iiunia 1954 oda.** [Change of radio signal intensity during the solar eclipse of June 30, 1954.] *Priroda*, Moscow, 44(5):113, May **1955.** fig. **DLC**—Reception of short wave radio signals during solar clipses when radiation flow is shut off by the moon is one of the methods of studying the ionized xygen layer. Such a study was carried out on the morning of June 30, 1954 at the Stalingrad Medical Institute during reception of radio signals from the Moscow radio station with about 25 m wave length. The received signals were compared with signals of a 2 scale sound generator enabling o change smoothly the frequency and level of the signals within 1 decibel. It has been established hat during the eclipse the intensity of the signals decreased by 48 decibels, and dropped almost to ero at the midpoint of the eclipse. An attached graph shows that the attenuation curve of the adio signal reception coincides almost completely with the phases of the eclipse. This denotes he comparatively large speed of recombination of ionized particles in the atmosphere in the absence f solar radiation, and the great sensitivity of the layer to all changes of solar activity. *Subject leadings:* **1. Eclipse effects on radio waves 2. Ionized oxygen layer 3. Ionospheric radio wave eflection.**—*A.M.P.*

9A–79 551.521.9:621.396.8:523.8

Kraus, J. D. and Ko, H. C., **A detailed radio map of the sky.** *Nature*, London, 175(4447):159–, 61, Jan. 22, **1955.** 2 figs., 5 refs. **DWB**—A mercator map of radio brightness of the sky on 250 Mc/s at Ohio is given. The galactic nucleus stands out as a sharp peak, profiles through which are hown. *Subject Heading:* **1. Stellar radio radiation.**—*C.E.P.B.*

9A–80 551.521.9:621.396.8:523.8

Kraus, John D., **Distribution of radio brightness across the Andromeda nebula.** *Nature*, ondon, 175(4455):502–503, March **19, 1955.** 2 figs., 5 refs. **DWB**—Discussion with average rofiles of radio brightness compared with optical brightness. The latter shows a smaller area for he nebula. *Subject Heading:* **1. Stellar radio radiation.**—*C.E.P.B.*

9A–81 621.396.8:523.8

Kraus, J. D.; Ko, H. C. and Stoutenburg, D. V., **A fluctuating celestial radio source at 240 negacycles per second.** *Nature*, London, 176(4476):304–305, Aug. **13, 1955.** fig., 2 refs. **DWB**— A radio source near the antigalactic center increased by a factor of 6 in fluctuations with a period of –3 min. The fluctuations are believed to be intrinsic. *Subject Heading:* **1. Radio stars.**—*C.E.P.B.*

9A–82 621.396.8:523.8

Larenz, R. W., **Zum Mechanismus der überthermischen kosmischen Radiofrequenzstrahlung.** Mechanism of superthermal cosmic radiofrequency radiation.] *Naturwissenschaften*, 42(9):253–, 54, May **1, 1955.** 2 refs. **DWB**—Describes a mechanism by which a moving source of cosmic adiation can give rise to a potential difference of about 100 kv between two successive space charge xtremes. *Subject Heading:* **1. Galactic radio radiation.**—*C.E.P.B.*

9A–83 621.396.8:522

Lovell, A. C. B., **Radio astronomy.** *Royal Society of Arts, London, Journal*, 103(4957):666–682, Aug. 5, **1955.** 3 figs. (photos). **DLC.** Reprinted in *Weather*, 11(6):173–182, June **1956.** 3 figs. **DWB**—The discovery of radio waves from space in 1931 and the discovery and identification of adio stars are described; many of the sources are probably colliding nebulas. Another source is he spectral line emission of neutral hydrogen on a wave length of 21 cm. The detection of meteors by radio, radio echoes from the moon and planets, and the effects of solar flares on propagation of adio waves and the ionosphere are briefly referred to. *Subject Heading:* **1. Radio astronomy.**— *C.E.P.B.*

9A–84 621.396.11

Matt, S. and Kraus, J. D. (*I.R.E.*), **The effect of the source distribution on antenna patterns.** *Institute of Radio Engineers, N. Y., Proceedings*, 43(7):821–825, July **1955.** 9 figs., 10 refs., 16 eqs. **DWB**—The response pattern of an antenna is modified when source subtends an appreciable angle. Under these conditions the observed or resultant pattern is a function of both the true antenna pattern and the source distribution. This problem is important in radio astronomy and in radar. The general problem is formulated and solved for the particular case of a radio telescope antenna consisting of a 40 wavelength broadside array. Graphs are presented showing the effect of sources of various widths on the observed patterns. Using such graphs it is possible to deduce the approximate source extent from an observed pattern. The direct analytical solution for the source

distribution from the observed pattern is also considered and the limitations of the various methods are discussed. *Subject Headings:* **1. Antenna response pattern 2. Radio astronomy.**—*Authors' abstract.*

9A–85 551.521.7:629.396.8:523.7

Ovenden, Michael W., **The radio brightness of the quiet sun.** *Science Progress*, 43(171):446–454, July **1955.** refs. **DWB**—Radio waves from the sun, first recognized in 1945, now include a thermal component from the quiet sun, a thermal component and noise storms from sunspots, short outbursts and isolated bursts. This article deals with the first. Instrumentation and methods for centimetric, decimetric and metric wave-lengths are described and their interpretation in terms of the structure and temperature of the corona and chromosphere is considered. *Subject Heading:* **1. Solar radio radiation.**—*C.E.P.B.*

9A–86 551.521.9:621.396.8:523.8

Pawsey, J. L., **A catalogue of reliably known discrete sources of cosmic radio waves.** *Astrophysical Journal*, Chicago, 121(1):1–5, Jan. **1955.** 3 tables, 21 refs. **DWB**—As a part of the work of Commission 40 of the International Astronomical Union, a list of reliably known discrete sources of cosmic radio waves has been prepared by a committee consisting of J. G. Bolton, R. Hanbury Brown, F. G. Smith, and B. Y. Mills. In this paper this list is published, with a short description of the catalogue by the president of the commission, J. L. Pawsey. *Subject Heading:* **1. Galactic radio wave sources.**—*Author's abstract.*

9A–87 621.396.8:522(02)

†*Pawsey, J. L. and Bracewell, R. N., **Radio astronomy.** Oxford, Clarendon Press, **1955.** 361 p. 150 figs., 23 tables, 23 plates. Bibliog. at end of each ch. Price: 55 sh. (International Monographs on Radio). **DLC** (QB475.P3). Review by P. ten Bruggencate in *Die Naturwissenschaften*, Berlin, 44(17):476, Sept. 1, **1957.**—This substantial textbook covers the history of radioastronomy, techniques for observation of extraterrestrial radio waves, theory of radio waves in ionized gases, solar physics, solar radio waves, astrophysics, cosmic radio waves, thermal radio waves from moon, extraterrestrial radio echoes, meteors, and effects of terrestrial atmosphere on extraterrestrial radio waves. The work is well-indexed, excellently illustrated and contains good referencing lists at the end of each chapter. The last chapter discusses effects of the lower and upper atmosphere and ionosphere on absorption and twinkling of radio stars. *Subject Heading:* **1. Radio astronomy textbooks.**—*M.R.*

9A–88 621.396.8:523.45

Radio emission from Jupiter. *Nature*, London, 175(4468):1074, June 18, **1955. DWB**—Radio emissions from Jupiter on 22 Mc/s are reported by Carnegie Institution. They may be due to disturbances in the atmosphere of Jupiter similar to terrestrial thunderstorms. *Subject Headings:* **1. Planetary radio noise 2. Jupiter.**—*C.E.P.B.*

9A–89 551.521.9:621.396

Raimond, J. J., Jr., **Radiostraling van Jupiter.** [Radio radiation from Jupiter.] *Hemel en Dampkring*, The Hague, 53(10):193, Oct. **1955. DLC, DWB**—Jupiter, which is visible at dawn during Sept., is to be studied by radio astronomers in the winter and spring of 1956. This is to be accompanied by visual observations of which amateurs can contribute suggestions for proper procedures. *Subject Headings:* **1. Radio radiation 2. Jupiter.**—*I.L.D.*

9A–90 551.521.9:621.396.8:523.7

Reber, Grote, **Fine structure of solar radio transients.** *Nature*, London, 175(4446):132, Jan. **15, 1955.** 6 refs. **DWB**—High speed recordings on 480-51 Mc/s showed solar bursts to be made up of numerous small transients (pips), the structure and duration of which are described. There is a fundamental relation between their mode of generation, source in the solar atmosphere, and duration. *Subject Heading:* **1. Solar radio radiation.**—*C.E.P.B.*

9A–91 551.521.9:621.396.8:523.8

Reber, Grote, **Radio astronomy in Hawaii.** *Nature*, London, 175(4445):78–79, Jan. 8, **1955. DWB**—Observations of cosmic static at 10,020 ft on summit of Haleakala, Maui, are described. Sources in Cassiopeia and Cygnus show interference patterns at 100 Mc/s and considerable asymmetry. *Subject Headings:* **1. Stellar radio radiation 2. Maui, Hawaiian Islands.**—*C.E.P.B.*

9A–92 621.396.8:523.45

Shain, C. A., **Location on Jupiter of a source of radio noise.** *Nature*, London, 176(4487):836–837, Oct. 29, **1955.** 2 figs., 2 refs. **DWB**—Radio noise on 18.3 Mc/s on Jupiter is traced to a disturbance at the boundary between the South Temperate Zone and the South Temperate Belt, possibly originating in electrical discharges. *Subject Headings:* **1. Radio noise 2. Jupiter.**—*C.E.P.B.*

9A–93 621.396.8:523.82

Slee, O. B. (*Div. of Radiophysics, C.S.I.R.O., Univ. Grounds, Sydney*), **Apparent intensity riations of the radio source Hydra-A.** *Australian Journal of Physics*, Melbourne, 8(4):498–507, c. **1955.** 5 figs., 2 tables, 7 refs. **DLC**—This paper describes the results of a detailed study of e flux density of the discrete radio source, Hydra-A. Over a period of 12 months, approximately measurements of the Hydra-A intensity were compared with a similar number of observations other strong sources. It was concluded that the observed flux density of Hydra-A is much more riable than that of these other sources, although no periodic changes have yet been detected. ssible mechanisms for the observed intensity changes are discussed. *Subject Heading:* **1. Stellar dio radiation.**—*Author's abstract.*

9A–94 551.521.7:629.396.8

Swarup, G. and Parthasarathy, R., **Evidence of limb-brightening of the sun at 60 cm wave-ngth.** *Observatory*, London, 75(884):8–9, Feb. **1955.** fig., 3 refs. Christiansen, W. N. and arburton, J. A., **The sun in two-dimensions at 21 cm.** *Ibid.*, 9–10, fig., 2 refs. O'Brien, P. A. d Tandberg-Hanssen, P. A., **Distribution of radio-frequency brightness across the solar disk a wavelength of 60 cm.** *Ibid.*, 11–13, 3 figs., 6 refs.—*Subject Heading:* **1. Solar radio brightness.**

9A–95 551.521.7:629.396.8

Swarup, G. and Parthasarathy, R. (*both, Div. of Radiophysics, C.S.I.R.O., Univ. Grounds, dney*), **Solar brightness distribution at a wavelength of 60 centimetres, Pt. 1, The quiet sun.** *ustralian Journal of Physics*, Melbourne, 8(4):487–497, Dec. **1955.** 8 figs., 13 refs. **DLC**—A ultiple-element interferometer has been employed to determine one-dimensional distributions of dio brightness over the quiet sun at a wavelength of 60 cm for scanning directions varying from ° to 60° with respect to the central meridian of the sun. These observations have been compared th measurements by other workers at the same, or nearly the same, wavelength. The present servations are reasonably consistent with the two-dimensional brightness distribution derived ently by O'Brien and Tandberg-Hanssen (9A–94) with a two-aerial interferometer, but do t agree with the earlier results of Stanier at the same wavelength. The disagreement, largely e absence of the theoretically predicted limb-brightening in Stanier's results, may reflect actual anges in the sun over the solar cycle. However, the possibility of localized disturbed regions ecting Stanier's results for the quiet sun cannot be eliminated. *Subject Headings:* **1. Solar radio ightness 2. Interferometers.**—*Authors' abstract.*

9A–96 621.396.6

Takahashi, Tsuyoshi and Arai, Masuo, **Wide band VHF wattmeter.** *Japan. Radio Research boratories, Tokyo, Journal*, 2(7):99–105, Jan. **1955.** 5 figs., 2 tables, 3 refs., 13 eqs. **DWB**—is paper describes an instrument developed for reading directly power up to 60 w of transmitters frequencies of 30–200 Mc within the reading accuracy of 5%. The wattmeter employs the sistance-loop directional coupler as a kind of converter from the propagating wave power into the ltage measured by a high-sensitive square law valve voltmeter. The direct reading with high curacy over wide range of very high frequencies is achieved by the use of a coaxial cable connected tween the coupler and valve voltmeter and terminated by a variable condenser. By this means e input impedance of the voltmeter is kept to cancel out the change of coupling coefficients, viz., nversion ratio of voltage to power, with frequencies by adjusting the capacity of the variable ndenser to the chart of the frequency-dial reading of the condenser. In this wattmeter the forward d backward propagating power in the main line is separated by the rotation of the coupling loop the directional coupler. Thus the transfer ratio of voltage to watt of both propagating powers e equal to each other, compensation for its change with frequencies is simplified, and the power is dicated by one indicator. In addition, it is also possible to act as a directional coupler; a simple d compact standing wave ratio meter, matching indicator etc., and SWR of 1.05–200 are measured this meter within accuracy of about 5%. *Subject Heading:* **1. Wattmeters.**—*Authors' abstract.*

9A–97 551.521.7:621.396

Tandberg,Hanssen, Einar (*Inst. of Theoretical Astrophysics, Oslo and Mt. Wilson and Palomar bs.*), **On the correlation between radio-frequency radiation from the sun and solar activity.** *Astro-ysical Journal*, Chicago, 121(2):367–375, March **1955.** 7 figs., 2 tables, 11 refs. (Also issued as slo. *Universitet. Institutt for Teoretisk Astrofysikk, Reprint*, no. 10.) **DLC**—An investigation is ade of the correlation between radio-frequency radiation from the sun and solar activity, sunspots, ominences, and geomagnetic disturbances. The difference in observed directivity and intensity the radiation at different frequencies is explained by the reflection conditions in the sun's at-osphere. A distinction is made between radio-noise active and radio-noise inactive sunspots. *ubject Headings:* **1. Solar radio radiation 2. Solar activity.**—*Author's abstract.*

9A–98 551.521.9:621.396.8:523.8

Voigt, H. H., **Identifizierung der kosmischen Radiostrahlungsquellen mit optischen Objekten.** [Identification of cosmic radio sources with optical objects.] *Naturwissenschaften*, 42(5):115–119, March 1, **1955.** 2 figs., 10 refs. **DWB**—The two "windows" in the atmosphere are 3000–30,000 Å (optical) and 1 cm–20 m. Radio radiators are defined as objects which emit radio radiation far exceeding the long-wave extension of thermal radiation. Types of nonradiating and radiating optical objects are listed. Extragalactic emissions from Crab nebula, Cassiopeia, Cygnus, etc., and emissions from the Milky Way are discussed. *Subject Headings:* **1. Stellar radio radiation 2. Galactic emissions.**—*C.E.P.B.*

9A–99 621.396.8:523.85

Voigt, H. H., **Radioquellen ausserhalb der Milchstrasse.** [Radio sources outside the Milky Way.] *Umschau*, 55(24):744–746, Dec. 15, **1955.** 2 figs. **DLC**—So far radio emission has only been found from spiral Sc nebulas such as Andromeda, some colliding star swarms such as Cygnus A (very strong), and an elliptical nebula emitting a "plume" of unknown composition. The sources are probably turbulent gas clouds. *Subject Heading:* **1. Radio stars.**—*C.E.P.B.*

9A–100 551.521.7:629.396.8

Waldmeier, Max, **Die Variation der solaren radiofrequenten Strahlung bei $\lambda = 10.7$ cm im 11 jährigen Sonnenzyklus.** [The variation of the solar radio frequency radiation at $\lambda = 10.7$ cm in the 11 year sunspot cycle.] *Zeitschrift für Astrophysik*, 36:181–193, **1955.** 4 figs., 4 tables, 9 refs. 7 eqs. Reprinted as *Zurich. Eidgenössische Sternwarte, Astronomische Mitteilungen*, No. 190 (1955). **DWB**—The variable component of the solar radio-emission at 10 cm wavelength is explained, as in an earlier paper, as thermal emission of the coronal condensations. Two kinds of condensations are distinguished according to whether they contain spots or not. The component arising from the condensations connected with spots increases from 0 to 65, the component of the spotfree condensation from 0 to 48 as the sunspot-relative-number varies from 0 to 150. The undistributed radiation-intensity of the sun, free from condensations, amounts to 57 units. *Subject Headings:* **1. Solar radio radiation 2. Sunspot cycles.**—*Author's abstract.*

9A–101 621.396.8:523.7

Wild, J. P., **Radio waves from the sun.** *Scientific American*, N. Y., 192(6):40–44, June **1955** photos, diagr. **DLC**—The phenomenon of radio bursts from the sun accidentally discovered by English radio operators during the air battles over England in Feb. 1942 has been taken up after the war and explored by the Australian Commonwealth Scientific Organization which constructed a set of "radio spectroscopes" recording the sun's normal emissions and its sudden bursts over a wide spectrum of radio frequencies (from 40 to 240 megacycles). This enabled one to explore systematically all levels of the corona and to follow the development of a burst from the depths. The author explains the operation and method of recording the sun's emissions which, for a period of several years, show the existence of 2 distinct types of bursts—a brief "radio flash" lasting a few seconds and a less frequent one called "outburst" lasting several (up to 10–20) min. He discusses the train of events taking place at the time of solar flares and influencing not only the vast regions of the solar atmosphere but also the earth's atmosphere and suggests that the whole phenomenon is the result of violent explosion near the surface of the sun, which ejects clouds of fast particles at speeds approaching the velocity of light. The atoms are stripped of their electrons and are channeled along lines of magnetic force into jet-like streams. These streams reach the outer layers of the corona within seconds of the explosion and their passage is signaled by radio flashes recorded by the radio spectroscopes. Photos and drawings show: the surge prominence, sunspots, the installation near Sydney, the tracings of outbursts on recorders, and a model of spectra through which the cloud passes and which omit radio waves of characteristic frequency. *Subject Headings:* **1. Solar radio noise 2. Radio noise bursts.**—*A.M.P.*

1956

9A–102 621.396.8:52

American Geophysical Union. Special Committee on Cosmic-Terrestrial Relationships **Report for the year ending June 30, 1956.** Harlan T. Stetson, chairman. *American Geophysical Union, Transactions*, 37(4):491–496, Aug. **1956.** 23 refs. **DWB, DLC**—Reviews are given of solar research by the Harvard Observatory and by the McMath-Hulbert Observatory, the work of radio astronomy, the upper atmosphere, solar radiation and audio-frequency atmospherics by the Naval Research Laboratory on relationship between solar activity and meteorological changes, on sunspot-weather correlations and on solar energy exchange in the atmosphere. *Subject Headings:* **1. Solar research 2. Radio astronomy.**—*I.L.D.*

9A–103 551.521.7:621.396.8

André, Pierre; Kazes, Ilya and Steinberg, Jean-Louis, **Mesure de l'absorption atmosphérique r 9350 Mhz utilisant le rayonnement radioélectrique solaire.** [Measurement of atmospheric rsorption at 9350 Mhz using solar radioelectric radiation.] *Académie des Sciences, Paris, Comptes ndus*, 242(17):2099–2101, April 23, **1956.** fig., 4 refs., 2 eqs. **DLC**—Solar radiation at 9350 hz undergoes an attenuation while the sun is setting. Only a part of this attenuation can be tributed to absorption by atmospheric oxygen and water vapor, a residual 35% remaining unplained. *Subject Heading:* **1. Solar radio radiation absorption.**—*Trans. of authors' abstract.*

9A–104 621.396.62

Bowhill, S. A., **Pulse synchronization equipment and wideband 75 Kc/s T.R.F. Receiver.** nnsylvania. State Univ. Ionosphere Research Laboratory, Contract AF 19(604)-1304, Scientific eport No. 82, Feb. 1, **1956.** 24 p. 9 figs. (incl. photos), eqs. **DWB**—Two newly developed eces of instrumentation are described. They are intended to replace some existing equipment for ceiving 75 kc/s pulse signals. The pulse synchronization equipment uses the phase coherence of e line voltage at the transmitter and the receiver as a time reference. The T.R.F. receiver achieves wide bandwidth and high gain by using preset stagger-tuned circuits. Detailed circuit descriptions d adjustment procedures are given. *Subject Headings:* **1. Radio recorders 2. Pulse synchronizan.**—*Author's abstract.*

9A–105 621.396.8:522

Bracewell, R. N., **Two-dimensional aerial smoothing in radio astronomy.** *Australian Journal Physics*, Melbourne, 9(3):297–314, Sept. **1956.** 5 figs., 4 tables, 6 refs., 10 eqs. **DLC**—The *sibility* of a Fourier component of a two-dimensional temperature distribution which is scanned certain kinds of rigid aerial is given by the normalized complex autocorrelation function of the ld distribution over the aerial aperture (assuming that turning the aerial in its own plane is not lowed). Hence, for finite aerials, the visibility of the Fourier components falls to zero at finite lues of spatial frequency. Consequently observations need only be made at certain *peculiar tervals* whose size is worked out. *Interpolation* between observations so spaced can be carried t by a method which, by a simple extension, permits *filtering* of data which are to be freed from gh spatial frequencies. Both interpolation and filtering are basic processes in the handling of o-dimensional data and contour maps in radio astronomy. The *restoration* of smoothed data is scussed from the viewpoint that only the simplest operations on extensive two-dimensional data e feasible, and details of a suitable technique of restoration are summarized. Application of *rther smoothing* to existing data is shown to be important, and a method for doing it is given, again nder the restriction to simple operations. The *flux density* of a source is shown to be given exactly summing one in four of the isolated values observed at the peculiar intervals. *Subject Headings:* **Radio astronomy 2. Aerial smoothing.**—*Author's abstract.*

9A–106 551.521.7:621.396.8:523.75

Bracewell, Ronald N. and Preston, George W. (*both, Berkeley Astronomical Dept., Univ. Calif.*), **adio reflection and refraction phenomena in the high solar corona.** *Astrophysical Journal*, Chic., 3(1):14–29, Jan. **1956.** 14 figs., table, 19 refs., 13 eqs. **DWB, DLC**—At the lowest frequencies ed in radio astronomy, e.g., at 18 Mc/s, the sun has not yet been observed; but if existing data are rrect, it presents a number of curious features: (a) the size of the sun as a radio-frequency source two to three times the size of the visible sun, but in place of a sharp limb, there is merely a gradual ding-away into the background; (b) a zone of sky is occulted by the sun, and, because significant fects of refraction reach farther out into the corona than the effects of absorption, the occulted ne is some nine times larger than the photosphere; (c) the sun exhibits an occulting disk whose ameter is six times that of the photosphere and which differs from the emitting disk in having a arp limb; (d) the discrepancy in size between the occulted zone and the occulting disk is associated ith apparent displacement of the unocculted sky toward the sun by refraction; (e) within the culting disk the sun behaves as a convex reflector, mirroring the whole of the unocculted sky. he reflection of the Galaxy, though greatly diminished in size, remains comparable as a radio urce with the emitting sun itself. If observed with existing aerials, which are incapable of resolving e solar emission from the galactic reflection, the sun should apparently exhibit a marked annual riation of flux density. *Subject Headings:* **1. Solar radio radiation 2. Radio effects in sun's rona.**—*Authors' abstract.*

9A–107 523.72

Cohen, M. H., **An 8.2 cm solar receiver and heliostat.** Cornell Univ. School of Electrical ngineering, Contract AF 19(604)-73, Scientific Report No. 6, Research Report EE 297, July 1, 56. 19 p. 7+ figs., 5 refs.—Changes made in the 8 ft paraboloid 3200 mc solar radio frequency ceiver at Sacramento Peak, N. Mexico, are described. These include changing frequency from

2600 to 3620 mc (8.2 cm) to avoid interference from the local radar; and installation of an elongated octagonal aluminum mirror (heliostat) about 8 ft wide and 15 ft long, mounted on a base which can be driven by clockwork so that the paraboloid "dish" can remain stationary. The construction, calibration and some resulting records are described and illustrated. A temperature of 30,000°–50,000° is calculated for the sun's disk based on an antenna temperature of 950° at the peak of the record curves. *Subject Headings:* **1. Heliostats 2. Radio telescopes 3. Solar radio noise 4. Sun's temperature.**—*M.R.*

9A–108 621.396.8:522(02)

*†Coutrez, Raymond, **Radioastronomie,** Ch. 1, **Le domaine radioastronomique** [and] Ch. 2, **Le rayonnement thermique.** [Radioastronomy, Ch. 1, Field of radioastronomy. Ch. 2, Thermic radiation.] *Ciel et Terre,* Brussels, 72(1/2):1–40, Jan./Feb. **1956.** figs., refs., eqs. Also: **Ch. 3, Le rayonnement Hertzien en radioastronomie.** [Ch. 3, Hertzian radiation in radioastronomy.] *Ibid.,* 72(3/4):151–181, March/April **1956.** Also, **Ch. 4, Lignes de transmission et aériens spéciaux utilisés en radioastronomie.** [Ch. 4, Transmission lines and special aerials utilized in radioastronomy.] *Ibid.,* 72 (5/6):245–280, May/June **1956.** Also, **Ch. 5, Les récepteurs radioastronomiques.** [Ch. 5, Radioastronomical receivers.] *Ibid.,* 72(7/8):405–436, July/Aug. **1956.** figs., refs., eqs. Also, **Ch. 6, La radiation lumineuse du soleil.** [Ch. 6, Luminous radiation of the sun.] *Ibid.,* 72(9/10):529–568, Sept./Oct. **1956.** figs., tables, refs. Also, **Ch. 7, La radiation Hertzienne d'origine solaire.** [Ch. 7, Hertzian radiation of solar origin.] *Ibid.,* 72(11/12):676–720, Nov./Dec. **1956.** figs., refs., eqs. Also, **Ch. 8, Physique de la galaxie et des systèmes extragalactiques.** [Ch. 8, Physics of the galaxy and of the extragalactic systems.] *Ibid.,* 73(1/2):1–43, Jan./Feb. **1957.** refs., figs., eqs. Also, **Ch. 9, Radioémissions galactiques et extragalactiques.** [Ch. 9, Galactic and extragalactic radioemissions.] *Ibid.,* 73(3/4):145–190, March/April **1957.** figs., 127–146/ 12 tables, refs., 304–388, 12 eqs. Also, **Ch. 10, Ondes radioélectriques et échos d'origine planétaire et météorique.** [Ch. 10, Radioelectric waves and echoes of planetary and meteoric origin.] *Ibid.,* 73(5/6):279–335, May/June **1957.** figs., 147–170, 18 tables, refs., 389–451, 55 eqs. **DLC.** Review (of whole book, issued Uccle, Observatoire Royal de Belgique, 1956) in *Naturwissenschaften,* 44(17):476, Sept. **1, 1957,** by Ten Bruggencate.—The first chapter of this excellent semi-technical series of articles on radio astronomy takes up the history of the science, the atmospheric factors affecting the absorption of the radio-waves (excellent schematic diagram shows factors effecting absorption up to 1000 km in all wave lengths of the emission spectrum) radiotelescopes, places of origin, and relation to other radiations; II, thermal origin of waves, and finally PLANCK's law. Ch. III takes up antennas and polarization of waves; Ch. IV circuits wave-guides, interferometers and effect of atmospherics; Ch. V receivers and amplifiers; Ch. VI, a long review of current knowledge of all types of radiation from the sun and variations due to sunspots, eruptions, coronal observations, etc. (95 refs.); Ch. VII concentrates on solar radio radiation in all its aspects (83 refs.) with many charts and records. Ch. VIII goes into the physics of galaxies and radio stars (53 refs.) and what we have learned about the differential spiral motions of nebulas or the Milky Way. The bulk of the literature in this field (up to 1955) is reviewed and ample illustrative material reproduced from these works. Ch. IX takes up more about galactic and extragalactic radio emissions, and Ch. X planetary and meteoric radio waves. *Subject Headings:* **1. Radio astronomy textbooks 2. Radio astronomy bibliographies.**—*M.R.*

9A–109 621.396:061.3

Dellinger, J. H., **International cooperation in radio research—URSI and IRE.** *Institute of Radio Research, N. Y., Proceedings,* 44(7):866–872, July **1956. DLC**—URSI (Int. Sci. Radio Union) deals with scientific and IRE with engineering and development aspects of radio science. IRE was established in 1912 in the U. S., whereas URSI was established in 1919 at the same time as IUGG under the Int. Research Council (later ICSU). Five presidents include A. E. KENNELLY (1932–4) and E. V. Appleton (1934–52). Places and dates of 11 General Assemblies 1922–1954 and the 7 Commissions are listed (Sec. II. is Tropospheric Propagation, III. Ionospheric Propagation, IV. Terrestrial Noise, V. Radio Astronomy). National Committees, the work and structure of the U. S. National Committee and some of the accomplishments of URSI, including the idea for IGY in 1957/8, are described. Joint committees with IUGG, etc. accomplish much in ionospheric and related research. *Subject Headings:* **1. International Scientific Radio Union 2. Institute of Radio Engineers.**—*M.R.*

9A–110 551.521.7:621.396.8:522

Denisse, J. F., **La radioastronomie et l'activité solaire.** [Radio astronomy and solar activity.] *Ciel et Terre,* Brussels, 72(5/6):205–214, May/June **1956.** 9 figs., 7 refs. **DWB**—An illustrated article describing the effects of solar disturbances on radio frequency radiations of various wave lengths and the probable source of these radiations. Many curves are presented to show quantitative relations during geomagnetic and solar storms. Cosmic rays are also linked with this radio fre-

quency activity—the probable mechanism is explained theoretically. *Subject Headings:* **1. Radio astronomy 2. Solar radio radiation.**—*M.R.*

9A–111 621.396.8:523.85:551.510.535

Dueño, Braulio (*Univ. of Puerto Rico, College of Agric. and Mech. Arts, Mayaguez*), **Low-angle fluctuations of the radio-star Cassiopeia as observed at Ithaca, N. Y., and its relation to the incidence of sporadic-*E*.** *Journal of Geophysical Research*, Wash., D. C., 61(3):535–540, Sept. **1956.** 4 figs., 2 refs. **DLC**—Low-angle fluctuation data of the radio-star Cassiopeia for the period comprised between Sept. 1954 to Aug. 1955 have been compared with ionospheric sounder data from Ottawa, Canada. A remarkable relation between the incidence of fluctuations and sporadic-*E* has been observed for the month of Dec. 1954. The coincidence of *E*s and fluctuations was found, in general, to be very good during the midwinter period and poor afterwards. The pierce-through region for ionospheric layers at a height of 400 km comes out approximately 1500 km north of Ithaca. In this region the normal sun-controlled forms of ionization should be a minimum during the midwinter period. It is reasonable to expect that layers at the 120-km level should be most influential in causing fluctuations during this period. Several fluctuationless days were recorded during this midwinter period and practically none at other times. *Subject Headings:* **1. Stellar radio radiation 2. Sporadic *E* layer (*Es*).**—*Author's abstract.*

9A–112 523.8:621.396

Ginzburg, V. L. (*Lebedev Physics Inst., Acad. Sci., U.S.S.R.*), **O neionosfernykh kolebaniiakh intensivnosti radioizlucheniia tumannostei.** [Non-ionospheric fluctuations in the intensity of radio emission from nebulae.] *Akademiia Nauk SSSR, Doklady*, 109(1):61–63, July 1, **1956.** 6 refs., 4 eqs. **DLC**—It is generally accepted that fluctuation of the intensity scintillation of discrete sources of cosmic clouds is caused solely by earth's ionosphere. Thence, the recently established fact that these excited intensity fluctuations from some source of non-ionospheric nebulae led to the assumption that this source is of stellar dimensions. Since evidence for non-ionospheric fluctuations are as yet inadequate, the author examines the conclusions that would have to be drawn should the existence of non-ionospheric scintillation of discrete sources be established definitely. It is also suggested that the source may not be stellar and the scintillation may depend upon the propagation of radio waves in interstellar or interplanetary space. *Subject Headings:* **1. Non-ionospheric radio emission 2. Stellar radio emission 3. Nebular radio sources.**—*I.L.D.*

9A–113 551.508.25:629.396.8

Goldstein, S. J., **A proposed solar radio interferometer.** Harvard Univ. Observatory. Solar Dept. Contract AF 19(604)-1394, Scientific Report, No. 1, **1956.** 12 p. 4 figs., 8 eqs. **DWB**—This paper is a description of a wide-band interferometer which will be located at Fort Davis, Tex. It will use two antennas separated by 1000 m on an east-west line and will accept signals in the frequency range 100–160 mc/sec. The "directivity pattern" of the instrument for a point source with a flat spectrum is a single strip 40 degrees by 2 min. The strip will be swept back and forth across the solar disc once per second. The instrument is designed to obtain measurements of one coordinate (approximately hour angle) of the position, and thus one component of the velocity of solar disturbances. It will operate in conjunction with a dynamic spectrum analyzer, so that spectra of the disturbances are simultaneously available. The wide-band interferometer will also provide, with the aid of data from the spectrum analyzer, information on the angular extent of the emitting regions. These measurements can be made several times, when the source has a life of only a few seconds. Sec. I is a description and analysis of the instrument. Sec. II contains a discussion of the measurements which can be made with the solar wide-band interferometer, while Sec. III comprises a cost estimate and a tentative time schedule for the construction. *Subject Heading:* **1. Solar radio interferometers.**—*Author's abstract.*

9A–114 551.521.7:621.396.8

Hauge, Øivind, **Statistical investigations of solar radio bursts on 200 Mc/s.** *Astrophysica Norvegica*, 5(8):227–240, May **1956.** 6+ figs., table, 6 refs., 2 eqs. **DWB**—9773 solar radio bursts from three different noise storm periods in July and Aug. 1955 are examined. A mean exponential amplitude distribution law is determined. There seems to be no distinct difference in the peak amplitude distribution between two of the periods examined. In the third period a deviation is found, probably caused by a variation in the burst generating mechanism in the solar corona. No difference in character of the amplitude distribution at the beginning, middle and end of the active periods is found. The distribution law therefore seems to be independent of the depth of the burst-generating regions in the solar corona. The amplitude distribution in the three periods investigated shows a hump at an amplitude of $3.7 \times 10^{-22} \mathrm{Wm}^{-2}(\mathrm{c/s})^{-1}$. This indicates the possible existence of a mechanism causing emission of specific burst amplitudes or burst energies. No variations in the

mean burst amplitude is found during short-lived changes in the noise storm activity. *Subject Heading:* **1. Solar radio noise bursts.**—*Author's abstract.*

9A–115 621.396:061.3

International Scientific Radio Union. *Nature*, London, 178(4532):528, Sept. 8, **1956.** footnote refs. **DWB**—Review of **Proceedings** of the 11th General Assembly, The Hague, Aug. 23–Sept. 3, 1954 (vol. 10, 5 parts). Pt. 3 deals with **Ionosphere radio** and Pt. 5 with **Radio-astronomy.** *Subject Heading:* **1. International Scientific Radio Union.**—*C.E.P.B.*

9A–116 621.396.8:523.8

Jennison, R. C. and Das Gupta, M. K., **The measurement of the angular diameter of two intense radio sources, Pt. 2, A radio interferometer using post-detector correlation.** *Philosophical Magazine, 8 ser.*, 1(1):55–64, Jan. **1956.** 5 figs., 5 refs. **Pt. 2, Diameter and structural measurements of the radio stars Cygnus A and Cassiopeia A.** *Ibid.*, 65–75. 5 figs., 4 tables, 6 refs. **DWB**—An instrument based on interferometer technique, with very high resolving power, is described. It was used at Jodrell Bank to measure angular diameters and structures of the radio radiation from the quiet sun and from Cygnus and Cassiopeia. Calibration is described. In Pt. II measurements of the latter sources are analyzed. The Cygnus source is represented by a 2-body model (galactic collision) and an attempt is made to estimate its temperature. In both sources the correlation between radio frequency and photographic distribution is poor. *Subject Heading:* **1. Radio stars.**—*C.E.P.B.*

9A–117 621.396.8:523.42

Kraus, John D., **Class II radio signals from Venus at a wavelength of 11 metres.** *Nature*, London, 178(4525):159–160, July 21, **1956.** 3 figs., 2 refs. **DWB**—Following on 2 earlier communications to *Nature*, a different type (II) of signals is described. They occur in pulses of about 1 sec duration at intervals of a few sec to >1 min for periods of 5–10 min. Some pulses had echoes from the moon. *Subject Headings:* **1. Radio stars 2. Venus.**—*C.E.P.B.*

9A–118 621.396.8:523.42

Kraus, John D., **Impulsive radio signals from the planet Venus.** *Nature*, London, 178(4523):33, July 7, **1956.** 3 refs. **DWB**—Intense radio signals on 11 m were recorded from Venus on May 23 and 30, 1956, in bursts of 1 sec or less, peaks of activity about 90 min. apart. They were possibly due to lightning discharges of intensity the same as or less than terrestrial lightning. *Subject Headings:* **1. Planetary radio noise bursts 2. Venus.**—*C.E.P.B.*

9A–119 621.396.8:523.42

Kraus, John D., **Radio observations of the planet Venus at a wavelength of 11 m.** *Nature*, London, 178(4524):103–104, July 14, **1956.** 2 figs., ref. **DWB**—Describes further records of radio emissions from Venus showing a lobe pattern and superposed peaks at intervals of 90–20 min. An 11-day repetition of peaks is also suggested. *Subject Headings:* **1. Radio stars 2. Venus.**—*C.E.P.B.*

9A–120 551.590.24:621.396.8

Laffineur, M.; Coupiac, P. and Vauquois, V. (*all, Radio-Astronomy Lab., Astrophysical Inst., Paris*), **Observations radioélectriques de l'éclipse du 30 juin 1954.** [Radio electric observations of the June 30, 1954 eclipse.] (In: **Solar eclipses and the ionosphere: a symposium** . . . ed. by W. J. G. Beynon and G. M. Brown. London, Pergamon, **1956.** p. 261–263. fig., 3 tables, 3 refs. **DWB** (523.7 S684)—The authors have observed the eclipse with the aid of the radio telescope already used by one of them in 1952 at Khartoum. The curve of the eclipse appears very regular more so than in 1952, while the emission at the instant of optical totality is less intense than in 1952 (14.7% against 19.5% on 545 Mc/s). *Subject Headings:* **1. Solar eclipse, June 1954 2. Radio telescopes 3. Solar radio radiation during eclipses.**—*Authors' abstract.*

9A–121 621.396.8:523.8

Lamden, R. J. and Lovell, A. C. B., **The low frequency spectrum of the Cygnus (19N4A) and Cassiopeia (23N5A) radio sources.** *Philosophical Magazine, 8 Ser.*, 1(8):725–737, Aug. **1956.** figs., 2 tables, 21 refs. **DWB**—The intensities of the radio sources in Cygnus (19N4A) and Cassiopeia (23N5A) have been measured at frequencies of 16.5, 19.0, 22.6 and 30.0 Mc/s by using the 218-foot aperture transit radio telescope at Jodrell Bank. The main feature of the results is the abrupt fall in intensity of both sources at frequencies below 22 Mc/s. Possible causes of this behavior are discussed and it is shown that the effect is probably due to absorption of the radiation in an interstellar HII region of average density and extent. *Subject Heading:* **1. Radio stars.**—*Authors' abstract.*

9A–122 551.590.24:551.594.7

Lauter, Ernst August (*Met. Obs., Kühlingsborn, Ger.*), **Measurements on medium and low frequencies and of atmospheric noise during the solar eclipse of June 30, 1954.** (In: **Solar eclipses and the ionosphere: a symposium** . . . ed. by W. J. G. Beynon and G. M. Brown. London, Pergamon, **1956.** p. 124–125.) **DWB** (523.7 S684)—Eclipse effects on the intensity of sky-waves received on various frequencies at distances varying from 180 to 700 km are described. The dependence of the duration of the effect (delayed start and premature ending relative to the eclipse) on frequency and distance can be interpreted in terms of a simple D region of double structure. Atmospheric-noise measurements on 8 to 69 kc/s indicate an increase up to the eclipse maximum (depending on frequency and distance) and a steep decrease afterwards. *Subject Headings:* **1. Solar eclipse, June 1954 2. Eclipse effects on radio waves.**—*Author's abstract.*

9A–123 621.396.99:523.164

†Lovell, A. C. B., **Radio astronomy and the Jodrell Bank telescope: the 47th Kelvin Lecture.** *Institution of Electrical Engineers, Proceedings, Pt. B,* 103(12):711–721, Nov. **1956.** 9 figs., table, 7 refs., eqs. **DLC.** Summary in *Institution of Electrical Engineers, Journal, n.s.,* 2(23):668–669, Nov. **1956. DLC**—History of radio astronomy and of the Jodrell Bank telescope, design, construction, beam width, motion of telescope, investigations of radio waves from the galaxy, identification of some of the sources with supernovae polarization of the light by magnetic fields or the ionosphere, sources outside galaxy (nebulae), the problem of cosmology, spectral line emissions from neutral hydrogen gas, use of the telescope as a transmitter for lunar and planetary investigations, solar radio emission, corpuscular streams and the aurora and radio emissions from the planets are discussed and illustrated. Broad features of aurorae and meteor trails can be investigated in daylight. It is hoped that this telescope will make important contributions to IGY in 1957–8. *Subject Headings:* **1. Radio astronomy 2. Jodrell Bank telescope.**—*M.R.*

9A–124 621.396.8:523.7

Menzel, Donald H. and Krook, Max, **On the origin of solar radio noise.** Harvard Univ. Observatory. Solar Dept., Contract AF 19(604)-1394, Scientific Report No. 2, **1956.** 4 p. **DWB**—This paper discusses, in a general way, the problem of energy transport when gas-kinetic processes dominate. Coupling exists between the material and radiation fields, with the result that certain frequencies are amplified because the fundamental equations are non-linear. The effects of density gradient, temperature gradient, etc., are important because a disturbance of small amplitude in a region of high density may grow to large amplitude as it moves out through the solar atmosphere. The presence of magnetic fields further complicates the situation, making possible the distinction between longitudinal and transverse oscillations. The paper discusses the modes of oscillation, the coupling of the different modes, the setting-up of shock waves, and the possible conversion of mechanical energy into the form of radio frequency emission. *Subject Heading:* **1. Solar radio noise.**—*Authors' abstract.*

9A–125 551.521.7:629.396.8

*Nagoya. Univ. Research Institute of Atmospherics, **Data on solar radio emission with some notes.** *Nagoya. Univ. Research Institute of Atmospherics, Proceedings,* 4:90–129, Dec. **1956.** figs., mostly tables. **DWB**—Observations made at 3750 mc/s and 9400 mc/s with radiometers first put into operation in Nov. 1955 and used since May 1956 for routine observations 6 hrs a day. Attenuation due to thin clouds proved negligible, but that due to nimbus was as much as 40%. Results are given in extensive tables, curves, and scatter diagrams. Bursts prominent at 9400 mc/s were seen on Dec. 20, 1056. The daily flux density at the 2 frequencies has a correlation coefficient of +0.95 and the 5 component at 9044 mc is 0.8 of that at 3750 mc/s. Observations with an 8 element interferometer have been made 5 hrs a day since Nov. 1956. A burst sometimes occurs in a region where no intense radiation is usually observed. *Subject Headings:* **1. Solar radio emissions 2. Radiometers.**—*M.R.*

9A–126 621.396.8:522

Ovenden, Michael W., **A radio observation of the cosmological red-shift: the distribution of faint radio sources.** *Science Progress,* London, 44(176):647–655, Oct. **1956. DLC**—Transitions in the ground-state of neutral hydrogen are a source of waves of 1420 Mc/sec. The red-shift of the Cygnus A system is large and corresponds to a velocity of 16,700 km/sec. Problems of measurement of red-shift are discussed. In the second part the bearing of the distribution of radio sources on the evolutionary model of the universe is considered. *Subject Headings:* **1. Radio astronomy 2. Radio stars.**—*C.E.P.B.*

9A–127 621.396.8:522(08)

Pikel'ner, S. B., **Simpozium po radioastronomii v Dzhodrell Benk.** [Symposium on radio astronomy at Jodrell Bank.] *Astronomicheskii Zhurnal,* Moscow, 33(1):114–120, Jan./Feb. **1956.**

DLC—The International Astronomical Union Conference at Dublin from Aug. 29–Sept. 6, 1955 was preceded by a conference on Radioastronomy at the Manchester University Radioastronomical Observatory at Jodrell Bank on Aug. 25–27. The Soviet delegates were given a tour of the observatory on Aug. 24–25, and attended the scientific sessions, a summary of which is included in this report. Foreign (outside U.S.S.R.) radiotelescopes and observatories are described and illustrated on p. 120–126, in article entitled **Nekotorye radioastronomicheskie stantsii za rubezhom** [Radioastronomical stations abroad] by V. V. VITKEVICH and B. M. CHEKHACHEV. *Subject Headings:* **1. Radio astronomy symposia 2. Radio astronomy observatories.**—*M.R.*

9A–128 621.396:523.4

Planets emit radio waves. *Science News Letter*, 69(24):374, June 16, **1956. DWB, DGL**—Two types of radio frequency radiation are emitted from planets (Venus and Jupiter). They are caused by 1) heat absorbed from sun's rays and re-radiated and 2) electrical storms similar to thunderstorms. The temperature of Venus was found to be >212° although from optical methods a temperature only half that high was deduced. The latter applies only to the top of the Venus cloud layer, whereas the radio frequency waves indicate temperatures deep down in the cloud layer or perhaps at the surface of the planet. *Subject Headings:* **1. Radio waves from planets 2. Planetary temperatures 3. Venus.**—*M.R.*

9A–129 523.817:621.396.8

Priester, W., **Himmelskarte der 200 MHz-Strahlung.** [Sky chart of 200 MHz radiation.] *Umschau, Frankfurt a.M.*, 56(16):485–487, Aug. 15, **1956.** 4 figs., 6 refs. **DLC**—Radio radiation can penetrate the dust clouds which obscure part of the Milky Way, and so give a complete picture. Isophotes are given on 200 MHz of the whole heavens, combining those obtained by F. DRÖGE and W. PRIESTER at Kiel and by C. W. ALLEN and C. S. GUM at Canberra. This gives radiation temperatures ranging from <120 to >1200°K. Most of the cosmic radiation originates in our own Galaxy. The maximum is in a turbulent ionized gas cloud in colliding star systems in Cygnus A. *Subject Heading:* **1. Galactic radio radiation.**—*C.E.P.B.*

9A–130 621.396.029:523.43

Radio signals from Mars. *Science*, Wash., D. C., 124(3223):620, Oct. 5, **1956. DLC**—U. S. Navy announced detection of first radio waves from Mars, picked up with a 600 in. radio telescope at National Research Lab. in Wash., D. C. (where first radio signals from Venus were detected earlier in 1956). Emissions indicate an average temperature of Mars of slightly below 32°F. The 3 cm signals were picked up on 2 nights in early Sept. 1956. *Subject Headings:* **1. Martian radio waves 2. Planetary temperatures 3. Mars.**—*M.R.*

9A–131 621.396.029:523.45

Radio waves from Jupiter. *Current Science*, Bangalore, 24(7):218, July **1955. DLC, DWB**—Short note on discovery made by American and Australian radio physicists. Bursts of radio emission with one second duration on a wavelength of 14 m were observed. Seem to have localized origin. *Subject Headings:* **1. Radio astronomy 2. Radio waves from planets 3. Jupiter.**—*A.A.*

9A–132 621.396.8:523.817

Reber, Grote (*Research Corp., N. Y. C.*) and Ellis, G. R. (*Commonwealth Obs., Hobart, Tasmania, Australia*), **Cosmic radio frequency radiation near one megacycle.** *Journal of Geophysical Research*, Wash., D. C., 61(1):1–10, March **1956.** 9 figs., 4 refs. **DLC**—Observations were made of cosmic radio frequency radiation on frequencies of 2130 kc/sec, 1435 kc/sec, 900 kc/sec, and 520 kc/sec. Using fast photographic recording with a cathode-ray indicator, a method of recording was found which effectively reduced interference from atmospherics. The maximum intensity of the cosmic radiation at 2130 kc/sec was approximately 10^{-19} watt per square meter per cycle per sec ($W.M.^{-2}$ c/s^{-1}) per steradian, with an estimated error of 50%. At the other frequencies, the results were more uncertain, although the intensities were of the same order of magnitude, with perhaps lower intensities at lower frequencies. The ionospheric effects associated with observations near the critical frequency are discussed. *Subject Heading:* **1. Galactic radio radiation.**—*Based on authors' abstract.*

9A–133 621.396.8:523.7

Schiffmacher, E. R., **Investigation of solar radio frequency at USAF Upper Air Research Observatory, Sunspot, New Mexico.** Cornell Univ. School of Electrical Engineering, Contract AF 19(604)-73, Final report; Research Report EE 299, July 1, **1956.** 24 p. photo.—Radio Observatory at Sacramento Peak, New Mexico, and antennas for 3 wave lengths of radiation are shown in photograph. Work from 1948–1955 under 2 contracts are reviewed and summaries given for 12 reports or papers issued under these contracts. Optical effects observed in vicinity were compared

sh enhanced radio frequency radiations from sun. Radio astronomy technical reports and bibli- aphies prepared at Ithaca, N. Y., in connection with theoretical work and analysis of observations, also summarized. It was found that 200 Mc/sec was the most useful frequency for solar radio servations. *Subject Headings:* **1. Solar radio radiation observations 2. Radio astronomy of sun ionospheric effects on solar radiofrequency rays.**—*M.R.*

9A–134 621.396.8:522

Southworth, George C. (*Bell Telephone Labs.*), **Early history of radio astronomy.** *Scientific nthly*, Wash., D. C., 82(2):55–67, Feb. **1956.** 12 figs. (incl. photos), 10 refs. and notes. **DWB, C**—The author relates the history of the discovery of radio waves from the Milky Way by JANSKY 1931 and of radio waves from the sun in 1942 by the author and other investigators. The his- ical account is based in part upon the author's memory of events in which he participated per- tally, and upon the notes of various investigators. The existing knowledge of the radio spectrum, work on longwave static measurements carried out in the Bell Telephone Laboratories by FRIES, beginning of short wave static measurements by JANSKY (diagrams of the circuit used by JANSKY ing his discovery of radio waves from the Milky Way is shown), the steps toward the discovery radio waves emanating from the Milky Way, and GROTE REBER's studies of extraterrestrial se, and SOUTHWORTH's own work leading to the discovery of radio waves from the sun are re- wed. Photographs of apparatus used, samples of records obtained are presented. *Subject adings:* **1. Radio astronomy 2. History of radio astronomy.**—*I.L.D.*

9A–135 621.396.8:523.8

Stanley, G. J. and Price, R., **An investigation of monochromatic radio emission of deuterium m the galaxy.** *Nature*, London, 177(4522):1221–1222, June 30, **1956.** 3 figs., 4 refs. **DWB**— servations at Sydney, Australia, of radiation from the center of the galaxy on a frequency of 7.555–327.369 Mc/s showed that temperature of critical source is 800°K and abundance of deu- ium is less than 10^{-3} that of hydrogen. *Subject Headings:* **1. Galactic radio radiation 2. Sydney, stralia.**—*C.E.P.B.*

9A–136 551.521.7:629.396.8

Tanaka, Haruo and Kakinuma, Takakiyo, **The most intense burst of solar radio emission served on Feb. 23, 1956.** *Nagoya. Univ. Research Institute of Atmospherics, Proceedings*, 4:74–77, c. **1956.** 3 figs., ref. **DWB**—A violent outburst of solar radio emission was observed on Feb. 23, 56. A perfect record of the intensity was successfully obtained by 3750 and 9400 Mc/s radi- eters, together with a drift curve taken by an 8-element interferometer at 4000 Mc/s. The ximum intensity was 225 and 141 times as large as that of the quiet-sun radiation for 3750 and 00 Mc/s radio flux density, respectively. The position of the radio source at 4000 Mc/s slightly ved during the burst. The most probable E-W width of the radio source during the burst is minutes of arc, which corresponds to the maximum effective temperature of about 5×10^8 °K. *bject Headings:* **1. Solar radio emissions 2. Solar radio noise bursts.**—*Authors' abstract.*

9A–137 621.396.8:522

*Tandon, Jagdish Narain, (*Physics Dept., Univ. of Delhi*), **Radio astronomy.** *Science and lture*, Calcutta, 22(1):4–11, July **1956.** 2 figs., 2 tables, 27 refs. **DLC**—A review of discovery by NSKY (1931) of radio waves from space, and subsequent discoveries regarding sources of these liations, uses of the information in astrophysics, ionospheric physics and astronomy, and other pects of radio astronomy (meteor trail investigations, interstellar hydrogen, solar radio radiation, noes from ionosphere, etc.). It is demonstrated how this discovery has opened a window into nce that is 100 times as wide (with respect to the l. m. spectrum) as was possible with visible or otographic radiation. *Subject Heading:* **1. Radio astronomy.**—*M.R.*

9A–138 551.521.7:621.396.029.6

Theissing, H. H. and Caplan, P. J. (*both, Signal Corps Engr. Lab., Fort Monmouth, N. J.*), **easurement of the solar millimeter spectrum.** *Optical Society of America, Journal*, 46(11):971– 3, Nov. **1956.** 9 figs., 4 tables, 10 refs., 5 eqs. **DWB, DLC**—Solar millimeter radiation, isolated black filters, was received with a thermal detector in the focus of a 60-in. parabola. The trans- ssion of this radiation through woven copper wire mesh of various gauges was measured. Since ther theoretical nor experimental data on the filter characteristics of mesh were available, a crowave method was used to obtain this information. The resulting filter curves, together with solar measurements, made an evaluation of the millimeter spectrum possible. Also, a theoretical ctral curve was drawn, multiplying Rayleigh-Jeans' λ^{-4} intensity with Van Vleck attenuation a which were computed for the atmospheric conditions during the solar measurements, but raised ording to earlier experimental attenuation results of the authors. This curve was in good agree-

ment with the measured spectrum, showing that the observed short-wave cutoff near 0.9 mm is due to sharply rising attenuation; the observed peak between 1.0 and 1.1 mm lies in the predicted window, after which the spectral intensity falls off at longer wavelengths according to the λ^{-4} law. *Subject Heading:* **1. Solar microwave spectrum.**—*Authors' abstract.*

9A–139 621.396.8:522

Warwick, James W., **Current (Sept. 1955) status at English and French radio astronomy research on ionospheric and atmospheric problems.** Colorado. Univ. High Altitude Observatory, Climax, Contract AF 19(604)-1491, Scientific Report, No. 2, Jan. 8, **1956.** 5 p. **DWB**—A summary of research under way at Manchester Univ., Cambridge, London and Paris, along the lines of radio star scintillation measurements at VHF range, to determine ionospheric winds, eclipse results in June 30, 1954 and studies of scattering at 9350 Mc/s based mainly on unpublished work. *Subject Headings:* **1. Radio astronomy research 2. Ionospheric winds 3. Jodrell Bank, Eng.**—*M.R.*

9A–140 621.396.8:523.1

Warwick, James W., **Research carried out June 15–Sept. 15, 1955, (at the High Altitude Observatory).** Colorado Univ. High Altitude Observatory, Climax, Contract AF 19(604)-1491, Scientific Report, No. 1, Jan. 10, **1956.** 9 p. 8 refs., 13 eqs. **DWB**—Pt. IV, p. 6–8, gives the results of the author's solution of the problem of wave propagation of discrete radio noise sources in the ionosphere, assuming an accumulation of net charge in a magnetic field and with oblique incidence of the wave on a stratified region for normal incident, reflected, and transmitted waves. This solution was found to have been worked out previously by K. C. Westfold in Australia (1949). Notes on the author's visit to the Jodrell Bank Radio Observatory in connection with the International Astronomy Conference at Dublin are included. *Subject Headings:* **1. Radio noise propagation in ionosphere. I. Westfold, K. C.**—*M.R.*

9A–141 551.521.7:621.396.8:523.7

Wild, J. P. (*Div. of Radiophysics, C.S.I.R.O., Sydney*) and Zirin, H. (*High Altitude Obs., Univ. of Colorado, Boulder*), **On the association of solar radio emission and solar prominences.** *Australian Journal of Physics,* Melbourne, 9(3):315–323, Sept. **1956.** 6 figs., 6 refs. **DLC**—Prominence cinematograms made at Sacramento Peak and Climax in the years 1949–55 have been examined and compared with the solar radio records at 167 Mc/s. No close connexion was found between limb events and radio events, but some eruptions were found to be associated with simultaneous radio bursts. Three such cases are discussed in detail. The limb passages of large sunspots in 1949–5 were studied on both cinematograms and single exposure surveys with the view of finding a criterion for radio-noisy spots. It was found that spot groups showing looped prominences and downward streaming from the corona showed a marked tendency to produce radio noise storms. This result is ascribed to the fact that the seat of such storms must lie in the corona and in the presence of strong ordered magnetic fields. *Subject Headings:* **1. Solar radio emissions 2. Solar activity.**—*Authors' abstract.*

9A–142 621.396.8:523.3

Wild, J. P. (*Radiophysics Div., C.S.I.R.O., Sydney*), **Solar radio noise and the study of corpuscular streams from the sun.** (In: **Solar eclipses and the ionosphere: a symposium . . .** ed. by W. J. G. Beynon and G. M. Brown. London, Pergamon, **1956.** p. 258–260. 2 figs., 2 refs. **DWB**—Observations in Australia over several years with a dynamic spectroscope covering the frequency range 40–240 Mc/s have shown that most sporadic bursts of radio emission from the sun fall into two distinct spectral classes, having quite discrete ranges of outward radial velocity. Both types of radio burst may occur at the time of solar flares. It is thought that the slower velocities may be associated with the outrush from the sun of geomagnetic storm particles, while the very fast range of velocities may be associated with the ejection from the sun of the agency responsible for the increase in cosmic rays sometimes observed about one hour after flares. *Subject Headings:* **1. Solar radio noise 2. Solar flares 3. Corpuscular emissions from sun 4. Australia.**—*Author's abstract.*

9A–143 523.8:621.396.8

Zhelezniakov, V. V., **Radioizluchenie Iupitera.** [Radio emission from Jupiter.] *Priroda,* Moscow, 45(3):78–80, March **1956.** 2 figs., 3 refs. **DLC**—On the basis of non-Russian papers dealing with radio emission from Jupiter, the author discusses the discovery of the radio emission, the characteristics of the emission curve which resembles those obtained from thunderstorm electricity discharges at the earth's surface and suggests that thunderstorm and lightning may occur in the hydrogen atmosphere of Jupiter. *Subject Headings:* **1. Radio emission from planets 2. Jupiter**—*I.L.D.*

1957

9A–144 621.396.6:535.4

Alon, Iadine; Kundu, Mukul Ranjan and Steinberg, Jean-Louis, **Dispositif interférométrique r l'étude des sources solaires localisées centimétriques.** [Interferometer equipment for studying ılized solar sources of centimetric radiation.] *Académie des Sciences, Paris, Comptes Rendus,* (13):1726–1729, March 25, **1957.** 2 figs., 3 refs. **DLC**—The apparatus described consists of antennas placed at 60 m from each other and connected by wire with a central receiver. It is id for determining the apparent size of radio sources on the sun. Sample records are presented. *bject Heading:* **1. Interferometers.**—*G.T.*

9A–145 551.521.7:629.396.8

Christiansen, W. N.; Mathewson, D. S. and Pawsey, J. L., **Radio pictures of the sun.** *Nature,* ıdon, 180(4593):944–946, Nov. 9, **1957.** 4 figs., 2 refs. **DWB**—Account of instrument ("radio-ıiograph") 1240 ft long at C.S.I.R.O. Radiophysics Laboratory, Sydney, which gives pictures of in "light" of 21-cm radio waves, due to normal emission from bulk of lower corona, with bright ches due to unusually dense and hot regions. Operation began June 1957. Some early pictures shown together with optical pictures in Hα and white light. *Subject Heading:* **1. Solar radio issions.**—*C.E.P.B.*

9A–146 621.396.8:523.8

Dagg, M., **Radio-star ridges.** *Journal of Atmospheric and Terrestrial Physics,* 11(2):118–127, 57. 4 figs., 3 tables, 8 refs. **DWB**—A radio-star "ridge" effect has been investigated which is te different in character from the usual radio-star scintillations. The occurrence of ridges cor-ates more closely with ionospheric inhomogeneities in the E region than in the F region. A ergent-lens mechanism for the production of ridges is proposed which gives a qualitative explana-n of the main features. *Subject Heading:* **1. Radio stars.**—*Author's abstract.*

9A–147 621.396:523.88

Denisse, Jean-François; Lequeux, James and Le Roux, Emile, **Nouvelles observations du onnement du Ciel sur la longueur d'onde 33 cm.** [New observations of extraterrestrial radiation 33 cm wavelength.] *Académie des Sciences, Paris, Comptes Rendus,* 244(25):3030–3033, June 17, 57. 2 figs., table, 7 refs. **DLC**—Measurements of extraterrestrial radio frequency radiation orted in this paper comprise both background radiation measurement and determination of ividual sources. Locations and intensities of 13 sources (radio stars) are listed. *Subject Head-:* **1. Galactic radio radiation.**—*G.T.*

9A–148 551.510.535:621.396.8:523.8

Denisse, Jean François and Kundu, Mukul Ranjan, **Relation entre l'ionisation de la couche de l'ionosphère et le rayonnement solaire radioélectrique.** [Relation between ionospheric E-er ionization and solar radio-frequency radiation.] *Académie des Sciences, Paris, Comptes ndus,* 244(1):45–47, Jan. 2, **1957.** 2 figs., 8 refs. **DLC**—There is more and more evidence ggesting that E region ionization is produced by X rays in the range of a few times ten Å. This ɔe of radiation originates in high-temperature regions of the solar corona. As part of the radio-quency radiation from the sun also appears to originate in high-temperature regions, a statistical idy of E-region ionization and solar radio frequency radiation was undertaken. For the latter rameter, COVINGTON's data for 1947–1953 were used (10.7 cm). A close correlation was found :ween the two phenomena compared; this suggests a common mechanism, or at least interrelated nditions, for the production of solar X rays and solar radio frequency radiation. *Subject Headings:* **Solar radio radiation 2. Solar X-radiation 3. E layer ionization.**—*G.T.*

9A–149 522.1:621.396.8

Deutschlands neue Radiosternwarte. [Germany's new radio observatory.] *Naturwissen-aftliche Rundschau,* 10(1):32–33, Jan. **1957.** 2 figs. **DWB**—A brief history of radio astronomy given. Construction of the 500 m² parabolic antenna in the Eifel, initiated by Bonn Observatory described. Its first use will be to investigate the 21.1 cm radiation from interstellar hydrogen. *bject Heading:* **1. Radio observatories.**—*C.E.P.B.*

9A–150 621.396.8:523.7

Elgaröy, Ö., **Duration of transients in solar radio noise.** *Nature,* London, 180(4590):808–809, t. 19, **1957.** fig., 2 refs. **DWB**—Records of solar noise storms on 200 Mc/s with a bandwidth 0.3 Mc/s show that bursts can be resolved into several pips with a rather sharp peak at 0.28 sec. ıey have a tendency to occur in groups; when wave-length is doubled mean duration is halved. *bject Heading:* **1. Solar radio noise.**—*C.E.P.B.*

9A–151 621.396.8:523

Elgaröy, Öystein, **Frequency drift of short-time transients in solar radio noise.** *Nature*, London, 180(4591):862, Oct. 26, **1957.** fig., ref. **DWB**—Preliminary records on 199 and 200 Mc/s at Oslo are analyzed and some conclusions drawn. *Subject Heading:* **1. Solar radio noise.**—*C.E.P.B.*

9A–152 551.510.535:621.396.8:523

Harrower, G. A., **A consideration of radio star scintillations as caused by interstellar particles entering the ionosphere, Pt. 1, Daily and seasonal variations of the scintillation of a radio star.** *Canadian Journal of Physics*, Ottawa, 35(5):512–521, May **1957.** 6 figs., 9 refs. **Pt. 2, the accretion of interstellar particles as a cause of radio star scintillations.** *Ibid.*, p. 522–535. 12 figs., 2 refs. eqs. **DWB, DLC**—In Pt. 1, an analysis is made of measurements of the scintillations of the radio source in Cassiopeia recorded at Ottawa during 1954 at a frequency of 50 megacycles per second. After removal of the effect of the altitude of the source, the data show certain daily maxima occurring at solar times dependent on the date of the year. These maxima are found to comprise five separate groupings, two being present roughly from Sept. 13 to March 30, and the other three for the remainder of the year. The obvious lack of circular symmetry suggests a cause external to the solar system such as the infall of interstellar particles. The apparent directions of arrival of these particles are derived from the scintillation measurements. In Pt. 2, a previously reported analysis of measurements of radio star scintillation, which showed daily variations dependent on time of year, is here interpreted to be the result of the accretion of interstellar particles by the sun's gravitational field. After a brief general discussion of the accretion process, the measurements are examined in an attempt to provide an explanation on that basis. Five distinct features exhibited by the scintillation data are interpreted as resulting from particles arriving at the earth as follows: directly from interstellar space, from a collision region behind the sun (both directly and after having crossed the earth's orbit), and from the collision region by a process of accretion in the gravitational field of the earth. The velocities of certain of these particles are derived by simple applications of vector addition employing the known velocity of the earth. The collision region is calculated to be located a radial distance of 200 million miles from the sun. *Subject Headings:* **1. Radio star scintillation 2. Interstellar particles.**—*Author's abstract.*

9A–153 551.510.535:621.396.8:523

Harrower, G. A., **A consideration of radio star scintillations as caused by interstellar particles entering the ionosphere. Pt. 3, The kind, number, and apparent radiant of the incoming particles.** *Canadian Journal of Physics*, Ottawa, 35(7):792–798, July **1957.** 2 figs., 7 refs. **DWB, DLC**—In Pts. I and II, as the result of an analysis of measurements of the scintillations of the radio source in Cassiopeia, it was suggested that interstellar particles, captured by the gravitational field of the sun, contributed to the observed features. Arguments presented here lead to the conclusion that such particles must be hydrogen atoms. The number of hydrogen atoms reaching the earth is estimated to be 6×10^{16}/m²/sec. Their energy averages 9 or 22 electron volts, depending on whether or not they are ionized. It is concluded that the effect of this infall on the earth's ionosphere would be more than adequate to produce scintillations. The location of the radiant, subject to the possibility of some considerable error, is judged to be right ascension 17 hours, declination −30°. Based on this position of the radiant, the velocity of the interstellar hydrogen atoms in the vicinity of the sun is found to have the components: tangential 28×10^4 m/sec, radial 2×10^4 m/sec, and transverse 0.2×10^4 m/sec, with respect to the plane of our galaxy. *Subject Headings:* **1. Radio star scintillation 2. Interstellar hydrogen 3. Ionospheric structure.**—*Author's abstract.*

9A–154 621.396.8:523

Horner, F., **Radio noise from planets.** *Nature*, London, 180(4597):1253, Dec. 7, **1957.** 3 refs. **DWB**—J. D. KRAUS suggested that high frequency radio noise received from Jupiter and Venus may originate in discharges similar to terrestrial lightning (*Nature*, 178:33, **1956**). The author in the present note compares amplitudes of sferics and of planetary radio noise and finds the latter to be considerably larger than might be expected on the basis of KRAUS's hypothesis. The discrepancy could be explained by larger storm areas on the two planets and superposition of several discharges. But before the hypothesis could be accepted an explanation would have to be found for the fact that radio noise from Venus and Jupiter is received in the form of bursts rather than as continuous noise. *Subject Heading:* **1. Planetary radio noise.**—*G.T.*

9A–155 551.508.21:551.521

Kaĭdanovskiĭ, N. L.; Korol'kov, D. V.; Soboleva, H. S. and Khaĭkin, S. E., **Nabliudeniia poliarizatsii radioizlucheniia solnechnykh piaten na volne 3,2 sm.** [Polarization of radio emission from sunspots as observed on the 3.2 cm wave.] *Akademiia Nauk SSSR, Doklady*, 112(6):1011–1015, Feb. 21, **1957.** 4 figs., 3 refs. **DLC**—A polarization radiometer of high sensitivity (0.1%) is described. Previous work in the cm range was done only with 2% accuracy. Sunspots a

ely associated with circular polarization of a maximum up to 2.5% or an antenna temperature 00K. A still more accurate instrument is in the design stage. *Subject Headings:* **1. Radio ssions from sun 2. Radiometers 3. Sunspots.**—*A.A.*

9A–156 621.396.8:522

Lilley, A. E., **The absorption of radio waves in space.** *Scientific American*, 197(1):48–55, **1957.** 9 figs. **DWB, DLC**—Mostly about radio-astronomical problems associated with non-estrial absorption of hydrogen emissions. Radioastronomers work mainly with hydrogen lines cm), since 93% of all atoms in the universe are hydrogen. *Subject Heading:* **1. Radio astronomy.** *I.R.*

9A–157 621.396.8:523.8

Thomson, J. M., **An attempt to detect linearly polarized radio emission from the galaxy.** *Nature*, don, 180(4584):495–496, Sept. 7, **1957.** fig., 7 refs. **DWB**—The set-up is described. Observa-s were made at Cambridge, Eng., through Feb. 1957. Linear polarization of about 1% was cted at 05 and 17–18 h. *Subject Headings:* **1. Galactic radio radiation 2. Cambridge, Eng.** *E.P.B.*

SUPPLEMENTARY MATERIAL

9A–158 523.165

†Ryle, M. (*Cavendish Lab., Cambridge, Eng.*), **Radio astronomy.** *Reports on Progress in Physics*, 184–246, **1950.** 18 figs., refs. **DLC**—Translated into Russian as **Radioastronomiia.** *Uspekhi cheskikh Nauk*, Moscow, 46(4):508–588, April **1952.** 18 figs., bibliog. p. 586–588. **DLC**—erimental methods are described; then the results of observations of galactic and solar radiation presented. Theories covering these observations are put forward, the aim being a connected tment. Particular emphasis is placed on the experimental and theoretical work, carried out e the war, at the Cavendish Laboratory. *Subject Headings:* **1. Radio astronomy 2. Cavendish oratory, Cambridge, Eng.**—*Physics Abstracts, No. 23, 1951.*

9A–159 621.396.8:523.746

Loughhead, R. E. (*Sydney Univ., School of Physics, N.S.W.*), **The equations for a problem ing in Dungey's investigation of Bailey's theory of sunspot noise.** *Journal of Atmospheric and restrial Physics*, London, 4(4/5):163–174, **1953.** 58 eqs. **DWB, DLC**—In the investigation of e amplification, J. W. DUNGEY (*see* 9A–32) has paid particular attention to the possibility of e amplification in an axially symmetric model of the solar atmosphere over a sunspot. In the sent paper the differential equations of a small radiation field in a non-uniform ionized gas are wn to possess particular solutions, which, along the axis of symmetry, correspond to ordinary ularly polarized waves. By taking one of these solutions subject to the condition that there be net radial flow of wave energy either into, or away from, the axis, the electric vector $\mathbf{e}_0$ of the e along the axis and the associated electron velocity $\mathbf{u}_0$ are found to be related by the equations:

$$4\pi iwNq\mathbf{u}_0 = \left\{w^2 + c^2\frac{\partial^2}{\partial z^2}\right\}\mathbf{e}_0$$

$$\left\{i(w+\Omega) + \nu - \frac{1}{2N}\frac{\partial}{\partial z}(NU_{z0}) + U_{z0}\frac{\partial}{\partial z}\right\}\mathbf{u}_0 = \frac{q}{m}\left\{1 - \frac{U_{z0}}{w}\left(\eta + i\frac{\partial}{\partial z}\right)\right\}\mathbf{e}_0$$

re n obeys the equation $c^2\frac{\partial}{\partial z}(\eta\mathbf{e}_0\cdot\mathbf{e}_0^*) - 4\pi mw\frac{\partial}{\partial z}(NU_{z0})\mathbf{u}_0\cdot\mathbf{u}_0^*$. These equations form the ting point of DUNGEY's investigation of wave amplification in the axially symmetric model. *ject Headings:* **1. Solar radio noise 2. Sunspot radio radiation.**—*Author's abstract.*

9A–160 621.396.8:523.745

Takakura, Tatsuo and Baba, Kōzaburo (*Osaka City Univ.*), **The plasma ion noise radiated from discharges and solar flares.** *Japan. Science Council. Ionosphere Research Committee. Report onosphere in Japan*, 7(2):71–72, June **1953.** **DWB**—The mechanism of generation and radiation oise at 3300 m.c. produced by cold cathode discharges in an intensity which is equivalent to the mal radiation of 10^6–$10^{7\circ}$K at a current of d.c. 0.5 to 5 Amp. is regarded as analogous to the e at the boundary of burst-out solar materials and outer plasma in the solar atmosphere during r explosions. *Subject Heading:* **1. Solar radio noise.**—*I.L.D.*

9A–161 621.396.029:522.2

Bok, Bart J., **A national radio observatory.** *Scientific American*, N. Y., 195(4):56–64, Oct. 5. 13 figs. (incl. maps, photos and graph). **DLC**—The site at Green Bank, West Va. for the 140-ft radio telescope sponsored by the National Science Foundation and to be built and operated

by Associated Universities, Inc. (who operate Brookhaven National Laboratory), was chose because of its freedom from tornadoes, hurricanes, snowfall and radio interference. It is locate in an isolated valley at 2700 ft surrounded by 4000–4500 ft mountains, yet is within a days trav time of all the major cities of the Eastern U. S. A map shows the region of W. Va. and N.E. Ken tucky to be the only large area east of the Rockies which has not had a tornado. The radio inte ference level is a thousand times lower than that at the Navy Research Lab. in Washington whe the first U. S. radio telescope (50 ft diameter) is located. The 140 ft telescope will be smaller bu more precise than the 250 ft Jodrell Bank, Eng., telescope. Solar, planetary and reflected radiation as well as the 21 cm galactic radiations will be studied. *Subject Headings:* **1. Radio telescope 2. Green Bank, W. Va.**—*M.R.*

9A–162 551.521.7:629.396.8:523.7

Fokker, A. D.; de Munck, J. C. and de Feiter, L. D. (*all, Netherlands Postal and Telecommunications Services, The Hague*), **Eclipse observations of solar radio-frequency radiation on 200, 545, 300 and 9100 Mc/s.** (In: **Solar eclipses and the ionosphere: a symposium** . . . ed. by W. J. G. Beyn and G. M. Brown. London, Pergamon, **1956.** p. 272–274. fig.) **DWB**—A brief summary presented of solar radio-noise observations on four frequencies during the eclipse of 30 June 195 In the case of the frequencies 545 and 200 Mc/s, the duration of the radio eclipse exceeded that of th optical eclipses by about 10 and 13 min., respectively. For the higher frequencies the duratio of the radio and optical eclipses are approximately equal. In most cases, maximum phase of th radio eclipse occurred some minutes later than that of the visual eclipse. *Subject Headings:* **1. Sol radio radiation during eclipse 2. Solar eclipses 3. Solar eclipse, June 1954.**—*Authors' abstract.*

9A–163 621.396:522

Khaĭkin, S. E., **Radioastronomiia i izuchenie vselennoĭ.** [Radioastronomy and the study of th universe.] *Priroda*, 45(8):5–14, **1956.** 6 figs. (incl. photos). **DLC**—The author discusses th radio wave radiation of various cosmic bodies both heat radio wave radiation, non-heat radio wa radiation and the theories accounting for radio waves of non-heat origin, the conditions for th propagation of radio waves and the characteristics of radio telescopes, including their sensitivi and resolving power. *Subject Heading:* **1. Radio astronomy.**—*I.L.D.*

9A–164 523.75:621.3

De Jager, C. (*Utrecht*), **L'émission des sursauts radioélectriques solaires.** [Emission of radi electric bursts from the sun.] *Annales des Télécommunications*, Paris, 12(5):161–164, May 195 fig., 2 refs. **DLC**—The fine structure of solar radio bursts recorded by means of extremely sensiti equipment (Cornell, 1949–1950) is interpreted as being produced by successive excitation a attenuation of oscillations in the solar plasma, due to the displacement of a frontal disturba along the corona. The theory indicates a nonhomogeneous density distribution in the solar coron *Subject Heading:* **1. Solar radio noise bursts.**—*G.T.*

9A–165 551.521.7:629.390

Firor, John (*Carnegie Inst. of Wash.*), **Inferences from radio signals from the sun and plane** *National Academy of Sciences, Wash., D. C., Proceedings*, 43(1):2–8, Jan. **1957.** 4 figs., 14 re **DLC**—Discusses first radio brightness distribution of the sun and method of calculation. F compares the measured (Firor, 1956) and calculated (Smerd, 1950) distributions at 1.5 m wa length. Then discusses occultation of radio stars. From two radio occultation observations (Cr Nebula and Jupiter) it can be concluded that the corona in the range 4–20 solar radii is not simp an extrapolation of the optically derived corona. Concludes with discussion of active solar radiati which is the most complex feature of the radio corona. Observations of large increases of intensi frequently associated with optically observed phenomena on the sun, have been made. Interpre tion of these observations, however, have been controversial. *Subject Headings:* **1. Solar ra radiation 2. Radio star occultation.**—*M.L.R.*

9A–166 621.396.633:52

Hawkins, Gerald S. (*Harvard College Obs.*), **The development of radio astronomy.** *Americ Scientist*, New Haven, Conn., 45(1):13–27, Jan. **1957.** 7 figs. **DLC**—Describes equipment us in radio astronomy and explains how a radio telescope works using line drawings and a photogra Discusses radio signals from the sun, radio stars, the Milky Way and Jupiter. In conclusion, ref briefly to possibilities of studying outer space by using radar astronomy. *Subject Headings:* **1. Ra telescopes 2. Radio emission.**—*M.L.R.*

9A–167 621.396.8:522

Jansky, C. M., Jr., **The beginnings of radio astronomy.** *American Scientist*, New Haven, Cor 45(1):5–12, Jan. **1957.** photo. **DLC**—A biography of Karl Guthe Jansky (1905–1950). counts briefly family history, his brother's education and circumstances under which he beca

employee of the Bell Telephone Laboratories in 1928. Reviews KARL JANSKY's work from 1928–32 which led to the discovery which furnished the foundation for the science of radio astronomy (*see also* 9A–134). Closes with the statement that KARL JANSKY's "philosophy of life was that of a true scientist—perseverence, the accumulation of data, objectivity in analysis, modesty, credit to others for their contributions, and a willingness to leave the ultimate evaluation of one's work to the future." *Subject Headings:* **1. Biography of K. G. Jansky 2. Jansky, K. G.**—*M.L.R.*

9A–168 621.396.9:522.2

Jayaraman, A., **Radio astronomy.** *Current Science*, Bangalore, 26(12):369–374, Dec. **1957.** Photo. **DWB, DLC**—Refers briefly to the work of some of the pioneers in radio astronomy—JANSKY, SOUTHWORTH, HAY, BOLTON and STANLEY, and EWEN and PURCELL. Then describes the basic equipment and techniques used in radio astronomical studies: the radiometer (radio telescope), interferometers (one developed in Australia, one at Cambridge), refinements of interferometer techniques by RYLE and MILLS and LITTLE, and paraboloidal systems of aerials. Examples of the cylindrical paraboloid type of radio telescope are located at Jodrell Bank, Eng., Sydney, Australia and the Naval Research Laboratory, U. S. Other telescopes using the same system, the new "pencil beam" system or the Mills Cross principle are being constructed or have been completed. Article concludes with a survey of the knowledge that has been accumulated in the last 15 years on the radio emission from stars, galaxies and interstellar space. *Subject Headings:* **1. Radio instruments 2. Radio emission.**—*M.L.R.*

9A–169 621.396.633:522.2

The new Australian radio telescope. *Current Science*, Bangalore, 26(11):338–339, Nov. **1957.** Photo. **DLC**—This radio telescope was designed by WILBUR CHRISTIANSEN of the Radio Physics Division of Australia's Commonwealth Scientific and Industrial Research Organization. CHRISTIANSEN designed the present instrument to overcome the limitations of a previous interferometer which he had designed. The new instrument, which combines the principles of the former with the "Mills Cross" interferometer, consists of 64 parabolic dishes, each 19 ft in diameter and erected on an equatorial mount. Each arm of the cross consists of 32 dishes, with 40 ft space between them and extend 1,240 ft in length. The telescope is located at St. Mary's about 30 mi from Sydney. *Subject Headings:* **1. Radio telescopes 2. St. Mary's, Australia.**—*M.L.R.*

9A–170 621.396.633:522.2

Soviet Union's radio telescope. *Current Science*, Bangalore, 26(12):374, Dec. **1957. DWB, DLC**—The telescope is 130 m long with a radio-reflector having a collecting area of 400 sq m and capable of receiving radio signals of centimeter wave length. *Subject Headings:* **1. Radio telescopes 2. U.S.S.R.**—*M.L.R.*

9A–171 551.521.7:629.396.8

Kazès, Ilya, **Étude de la scintillation du soleil observée sur la longueur d'onde de 3,2 cm.** [Study on solar scintillation observed on 3.2 cm wavelength.] *Académie des Sciences, Paris, Comptes Rendus*, 245(6):636–639, Aug. 5, **1957.** 2 figs., 3 refs. Also: Kazès, Ilya and Steinberg, Jean-Louis, **Étude de la scintillation du soleil observée avec plusieurs antennes sur la longueur d'onde de 3,2 cm.** [Study of solar scintillation observed with several antennas on 3.2 cm wavelength.] *Ibid.*, 245(7):782–785, Aug. 12, **1957.** 3 figs., 2 refs. **DWB**—Fluctuations in solar radiation at 3.2 cm wavelength are shown to be of atmospheric origin. Effects of solar activity, wavelength and zenith distance on these fluctuations are discussed. According to the second paper the fluctuations were identified as shadow zones whose movements showed qualitative agreement with winds at the height of the tropopause. *Subject Headings:* **1. Solar radio radiation 2. Solar activity.** *M.G.T.*

9A–172 621.396.8:523.45

Shain, C. A. (*Div. of Radiophysics, C.S.I.R.O., Univ. Grounds, Sydney*), **18.3 Mc/s radiation from Jupiter.** *Australian Journal of Physics*, Melbourne, 9(1):61–73, March **1956.** 7 figs., 7 refs. **DLC**—BURKE and FRANKLIN's discovery of radio emission from Jupiter has been confirmed. Examination of old records has shown that in 1950–51 the radiation came in groups of bursts of very high intensity. Bursts have durations of the order of a minute or less; groups of an hour. Because of the remarkably close relation between active periods and the period of rotation of Jupiter, it is inferred that the source at the time was very localized. Its identification with a visual disturbance in the South Temperate Belt is very probable. It is pointed out that occultation by Jupiter's satellites may help to locate the sources of radiation, both in position and in height relative to the visible surface, and that Jupiter radiation should be a valuable tool for studying the outer regions of the Jovian corona. *Subject Headings:* **1. Radio emission from planets 2. Radio astronomy 3. Jupiter.**—*Author's abstract.*

PART III. REVIEWS, TRANSLATIONS, REPRINTS, RECENT MONOGRAPHS, AND ANALYTICS FROM SERIALS AND COLLECTED WORKS

Note: Material listed in these sections will not be included in the monthly indexes until abstracted. The item number is mentioned for those titles which have been abstracted in previous issues of **Meteorological Abstracts and Bibliography.**

A. REVIEWS OF IMPORTANT METEOROLOGICAL MATERIAL

Aller, L. H.: **Gaseous nebulae.** *International Astrophysics Series*, Vol. 3, pub. London, Chapman & Hall, 1956. 322 p. Price 63 sh. Review by F. Steinhauser in *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 10(1):119–120, 1957.

Augustin, Henri: **Rapport technique sur les opérations de pluie artificielle à Madagascar en 1953** [Technical report on artificial rain operations in Madagascar, 1953]. *Madagascar. Service Météorologique, Publications*, No. 23, 1954. 38 p. figs., refs. Summary by L. Pellisari in *Rivista di Meteorologia*, Rome, 15(2):68, April/June 1955. (*For abstract on the original, see* 6J–210, Oct. 1955, *MAB*)

Bachurina, A. A. and Turketti, Z. L.: **Usloviia obrazovaniia osadkov kholodnogo polugodiia i vozmozhnosti ikh prognoza** [Conditions of precipitation formation during the winter semester and means of forecasting it]. Leningrad, Gidrometizdat, 1955. 164 p. 25 figs. Review by István Bodolai in *Időjárás*, Budapest, 61(3):210–212, May/June 1956. Trans. of review into German, *Ibid.*, p. 234–236.

Baur, Franz: **Physikalisch-statistische Regeln als Grundlagen für Wetter- und Witterungsvorhersagen** [Physical-statistical rules as bases for forecasts of weather and weather character]. **Vol. 1.** Frankfurt a.M., Akademische Verlagsgesellschaft MBH, 1956. 138 p. 30 figs. 72 tables, 65 refs., eqs. Review by H. Flohn in *Beiträge zur Physik der Atmosphäre*, Frankfurt a.M., 29(4):317–318, 1957. Review by S. Mull in *Indian Journal of Meteorology and Geophysics*, Delhi, 8(4):462–463, Oct. 1957.

Bergeron, T.; Bjerknes, J.; Bungaard, R. C. and Godske, C. L.: **Dynamic meteorology and weather forecasting.** Boston, American Meteorological Society, and Washington, D. C., Carnegie Institution of Washington, 1957. 800 p. Review by F. Dési in *Időjárás*, Budapest, 61(3):238 May/June 1957.

Georgii, Walter: **Flugmeteorologie** [Aviation meteorology]. 2d enl. ed. Frankfurt a.M., Akademische Verlagsgesselschaft m.b.H., 1956. 332 p. 217 figs. Price DM 35. Review by F. Steinhauser in *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 10(1):112–114 1957.

B. TRANSLATIONS, REPRINTS AND RECENT MONOGRAPHS

TRANSLATIONS

Belinskiĭ, V. A.: **Simplest nomogram for psychometric calculations.** [Trans. into English of the original Russian, **Prosteishaia nomogramma dlia psikhrometricheskikh vychislenii,** in *Meteorologiia i Gidrologiia*, No. 5:32–35, May 1956. fig., 2 tables.] Trans. available DWB (MO8.7 B431si) (*For abstract on original Russian, see* 8.6–23, June 1957, *MAB*)

Bullig, H. J.: **Atlas of monthly values of water temperatures, wind and clouds on the Europe-South America sea route, from weather observations of German merchant ships.** [Trans. into English of the original German **Atlas der Monatswerte von Wassertemperatur, Wind und Bewölkung auf dem Seeweg Europa-Süd-Amerika, auf Grund von Wetterbeobachtungen deutscher Handelsschiffe,** issued as *Hamburg. Seewetteramt, Einzelveröffentlichungen*, No. . 1954. 25 p. numerous tables and diagrs.] Trans. available at Special Libraries Association Translation Center, John Crerar Library, Chicago, as its 57-2559. (*See* 6.7–83, July 195 *MAB*)

Observational data of the Scientific-Research Drifting Station of 1950/1951. [Trans. into English of various parts of the original Russian **Materialy nabliudenii nachno-issledovatel'skoĭ dreifuiushchei stantsii 1950/1951 goda,** ed. by Mikhail M. Somov. Issued Leningrad, Morskoĭ Transport, 1955. 3 vol.] Trans. by American Meteorological Society under Contract AF 19(604)-1936, 1956. Various parts available at ASTIA as its AD-117-132 and 133, 135 to 140.

Orlova, E. M.: **Calculation of vertical velocities according to wind field data.** [Trans. into English of the original Russian, **K voprosu o raschete vertikal'nykh skorosteĭ po dannym polia vetra,** in *Meteorologiia i Gidrologiia*, No. 1:8–15, Jan./Feb. 1955. fig., table, 2 refs., 11 eqs.] Trans. available at Special Libraries Association Translation Center, as its R-2116. 10 p. (*See* 7.7–74, July 1956, *MAB*)

Rau, Walter: **Ice nucleus concentration and ice-nucleus spectrum of the natural aerosol.** [Trans. into English of the original German, **Gefrierkerngehalt und Gefrierkernspektrum des natürlichen Aerosols,** in *Meteorologische Rundschau*, 7(3/4):59–64, 1954. 8 figs., table, 19 refs.] Trans. by Valda Dreimanis and James Gough, Jr., issued by American Meteorological Society, under Contract AF 19(604)-1936, July 1955. (*See* 5.8–194, Aug. 1954, *MAB*).

REPRINTS

Court, Arnold: **Climatology, complex, dynamic and synoptic.** *Association of American Geographers, Annals*, 47(2):125–136, June 1957. 60 refs. (*For abstract on this title from another source, see* 7.9–222, Sept. 1956, *MAB*)

Harris, D. Lee: **Effects of radioactive debris from nuclear explosions on the electrical conductivity of the lower atmosphere.** *U. S. Air Force. Cambridge Research Center, Geophysical Research Papers*, No. 42:140–146, Nov. 1955. 4 figs., 9 refs., 2 eqs. (*See* 6.8–341, Aug. 1955, *MAB*)

Harrison, Henry T.: **Display of hail echoes on 5.5-cm. weather mapping radar.** *Institute of the Aeronautical Sciences, Preprint*, No. 580, 1956. 13 p. 20 figs., 8 refs. (*See* 8.4–86, April 1957, *MAB*)

Inouye, W.; Hirono, T. and Murai, G.: **Microseisms and surf.** *Pacific Science Congress, 8th, Quezon City, Philippines, Nov. 1953, Proceedings*, Vol. IIA, pub. 1956. p. 1091–1098. 6 figs. (*See* 7.6–42, June 1956, *MAB*)

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PERIODICALS IN WHICH METEOROLOGICAL ARTICLES REGULARLY APPEAR

★**Acta Geophysica Polonica,** [Warsaw].
Akademiia Nauk SSSR, Izvestiia, Ser. Geogr. and **Ser. Geofiz.,** [Moscow].
American Geophysical Union, Transactions, [Washington.]
★**American Meteorological Society, Bulletin,** [Boston]
★**Angewandte Meteorologie,** [Potsdam].
Annales de Géophysique, Centre National de la Recherche Scientifique, [Paris].
★**Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A and Ser. B,** [Vienna].
Australian Journal of Physics, [Melbourne].
★**Australian Meteorological Magazine,** [Melbourne].
★**Ciel et Terre,** Société Belge d'Astronomie, Météorologie et Physique du Globe, [Brussels]
★**Geofisica e Meteorologia,** Società Italiana di Geofisica, [Genoa].
Geofisica Pura e Applicata, Istituto Geofisico Italiano, [Milan].
★**Geophysical Magazine,** Japan Meteorological Agency, [Tokyo].
Hemel en Dampkring, [The Hague].
★**Időjárás,** Magyar Meteorólogiai Társaság and Országos Meteorológiai Intézet, [Budapest].
★**Indian Journal of Meteorology and Geophysics,** [Delhi].
★**Journal of Atmospheric and Terrestrial Physics,** [London].
Journal of Geophysical Research, [Washington]
★**Journal of Meteorological Research,** [Tokyo].
★**Journal of Meteorology,** American Meteorological Society, [Boston].
★**Journal Scientifique de la Météorologie,** Société Météorologique de France, [Paris].
★**The Marine Observer,** Air Ministry, Meteorological Office, London.
★**The Meteorological Magazine,** Air Ministry, Meteorological Office, London.
★**Meteorologické Zprávy** [Prague]
★**Meteorological Society of Japan, Journal,** [Tokyo].
★**La Météorologie,** Société Météorologique de France, [Paris].
★**Meteorologiia i Gidrologiia,** [Leningrad]
★**Meteorologische Rundschau,** [Berlin].
★**Monthly Weather Review,** U. S. Weather Bureau, Washington, D. C.
Polarforschung, Archiv für Polarforschung, [Kiel].
★**Przegląd Meteorologiczny i Hydrologiczny,** [Warsaw]
Revista de Geofísica, Instituto Nacional de Geofisica, [Madrid].
★**Revista Meteorologica,** Junta Nacional de Meteorología, Montevideo.
★**Rivista di Meteorologia Aeronautica,** Servizio Meteorologico, [Rome].
★**Royal Meteorological Society, Quarterly Journal,** [London].
★**South Africa. Weather Bureau, Notos,** [Pretoria].
★**Tellus,** Svenska Geofysiska Föreningen, Stockholm.
Vsesoiuznoe Geograficheskoe Obshchestvo, SSSR, Izvestiia, [Leningrad].
★**Weather,** Royal Meteorological Society, [London].
★**Weatherwise,** American Meteorological Society, [Boston].
★**Wetter und Leben,** Österreichische Gesellschaft für Meteorologie, [Vienna].
★**WMO Bulletin,** World Meteorological Organization, [Geneva].
★**Zeitschrift für Meteorologie,** Meteorologisches Observatorium, Potsdam.

★ Indicates those periodicals which are primarily meteorological.

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